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Doucet et al.

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(54) **MOBILE STAGE FRAMEWORK AND METHOD OF HANDLING**

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patent is extended or adjusted under 35
U.S.C. 154(b) by 0 days.

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1, 2013.

(51) **Int. Cl.**

E04H 3/28 (2006.01)

B60P 3/025 (2006.01)

(52) **U.S. Cl.**

CPC **E04H 3/28** (2013.01); **B60P 3/025**
(2013.01); **B60P 3/0252** (2013.01)

(58) **Field of Classification Search**

CPC E04H 3/28; E04H 3/24; E04H 3/26;
E04H 3/12; B60P 3/025; B60P
3/0252; A47C 1/12

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Primary Examiner — Joshua J Michener

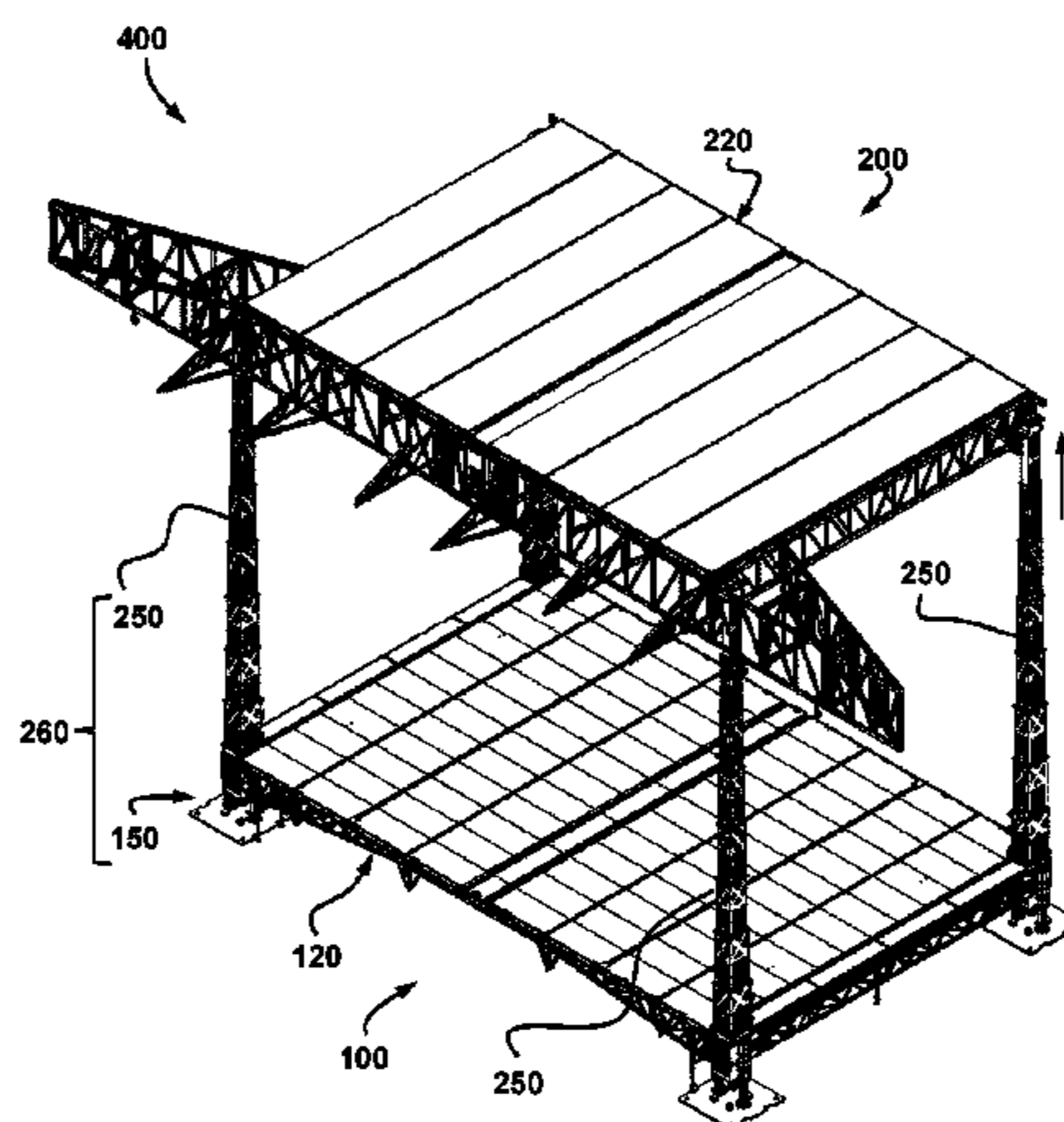
Assistant Examiner — Keith Minter

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(57) **ABSTRACT**

The mobile stage framework includes a plurality of spaced-apart column structures and a first and a second self-contained unit. Both units are separated from one another when the mobile stage framework is fully disassembled for transportation. The first unit includes an articulated floor structure and the second unit includes an articulated roof structure. Both structures are in an unfolded working position when the mobile stage framework is fully assembled and are in their folded transport position when the mobile stage framework is fully disassembled for transportation. A method of handling a mobile stage framework is also disclosed.

20 Claims, 56 Drawing Sheets



(58) **Field of Classification Search**
 USPC 52/6, 7, 8, 9, 10
 See application file for complete search history.

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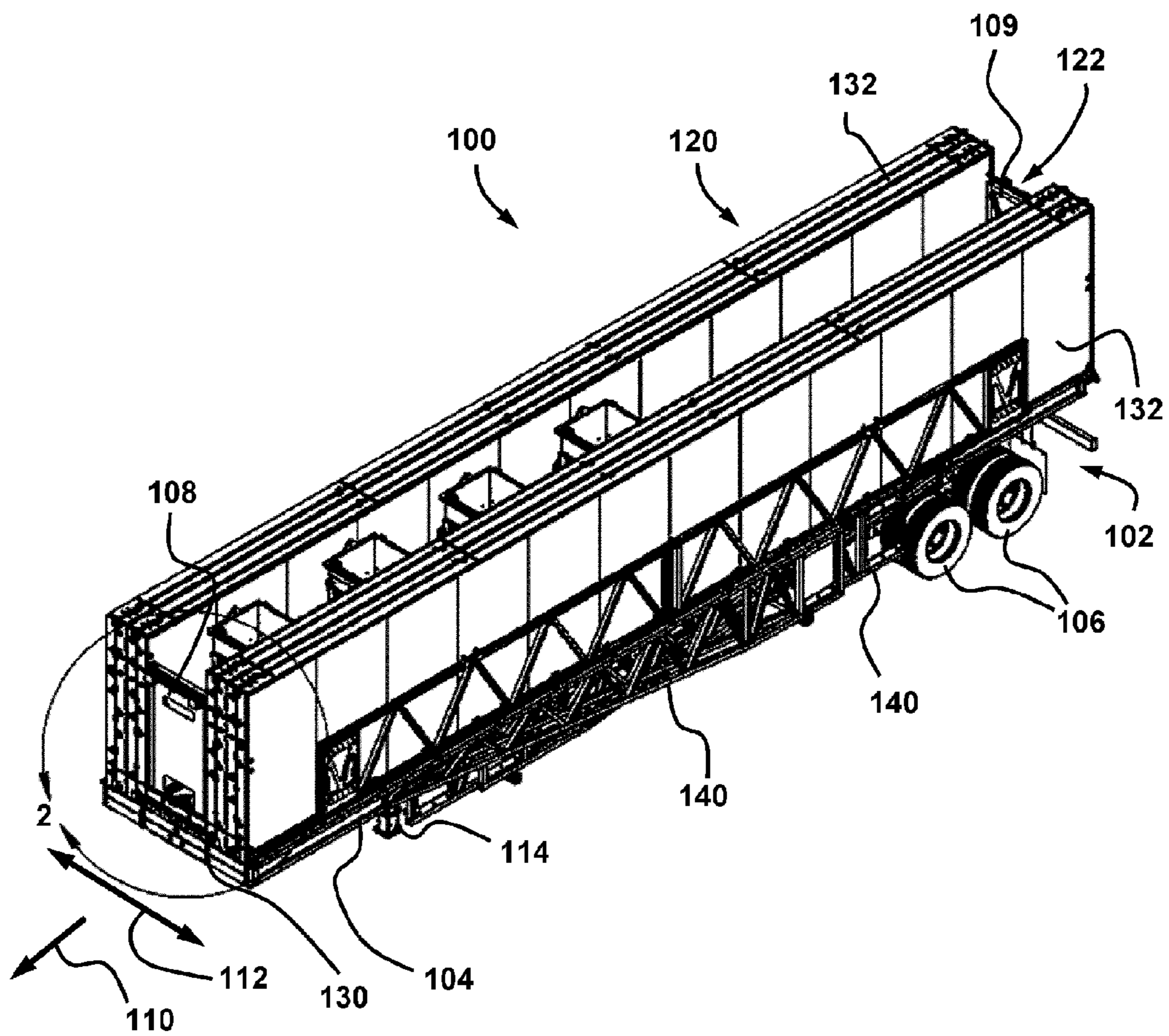


FIG. 1

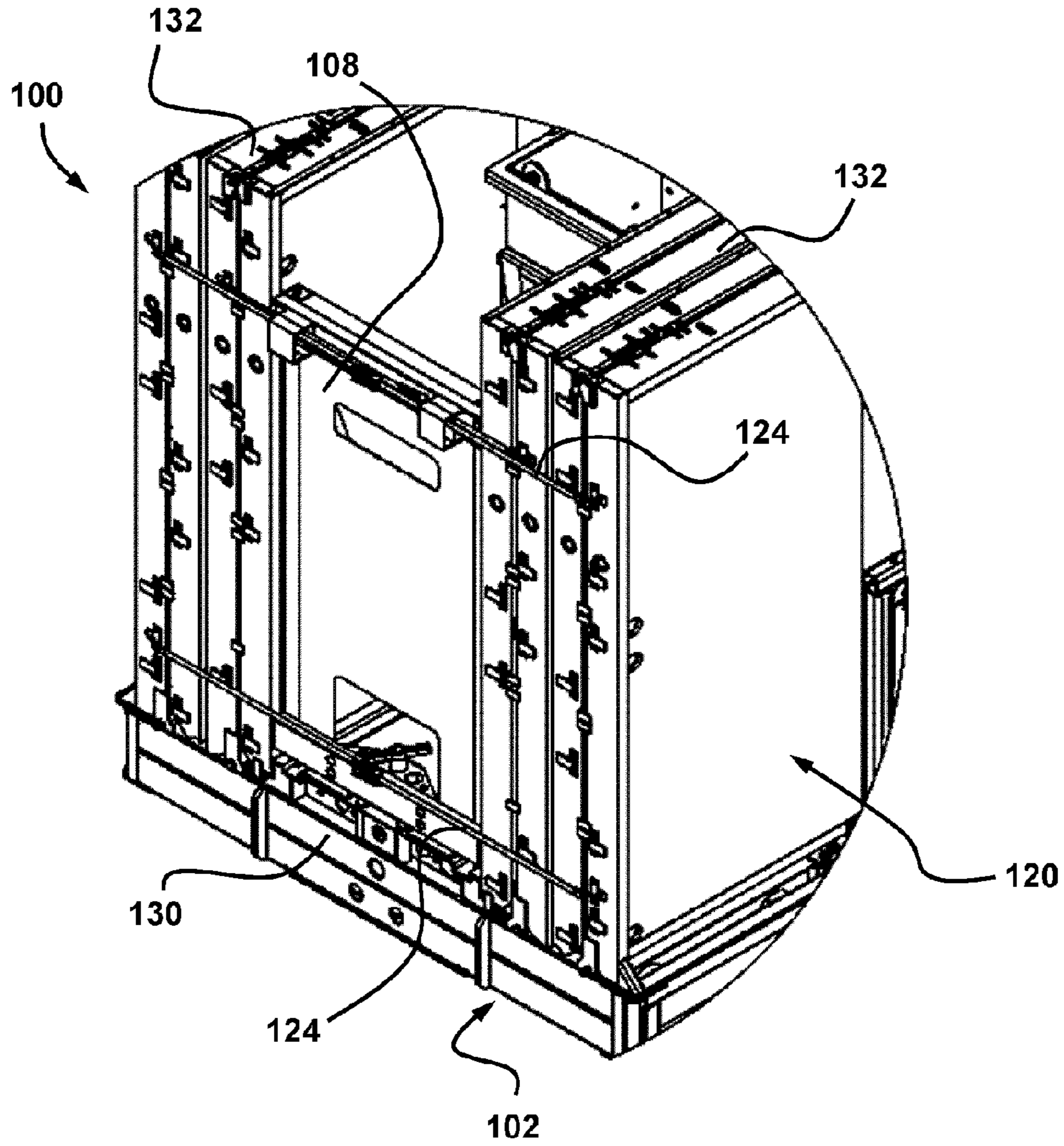


FIG. 2

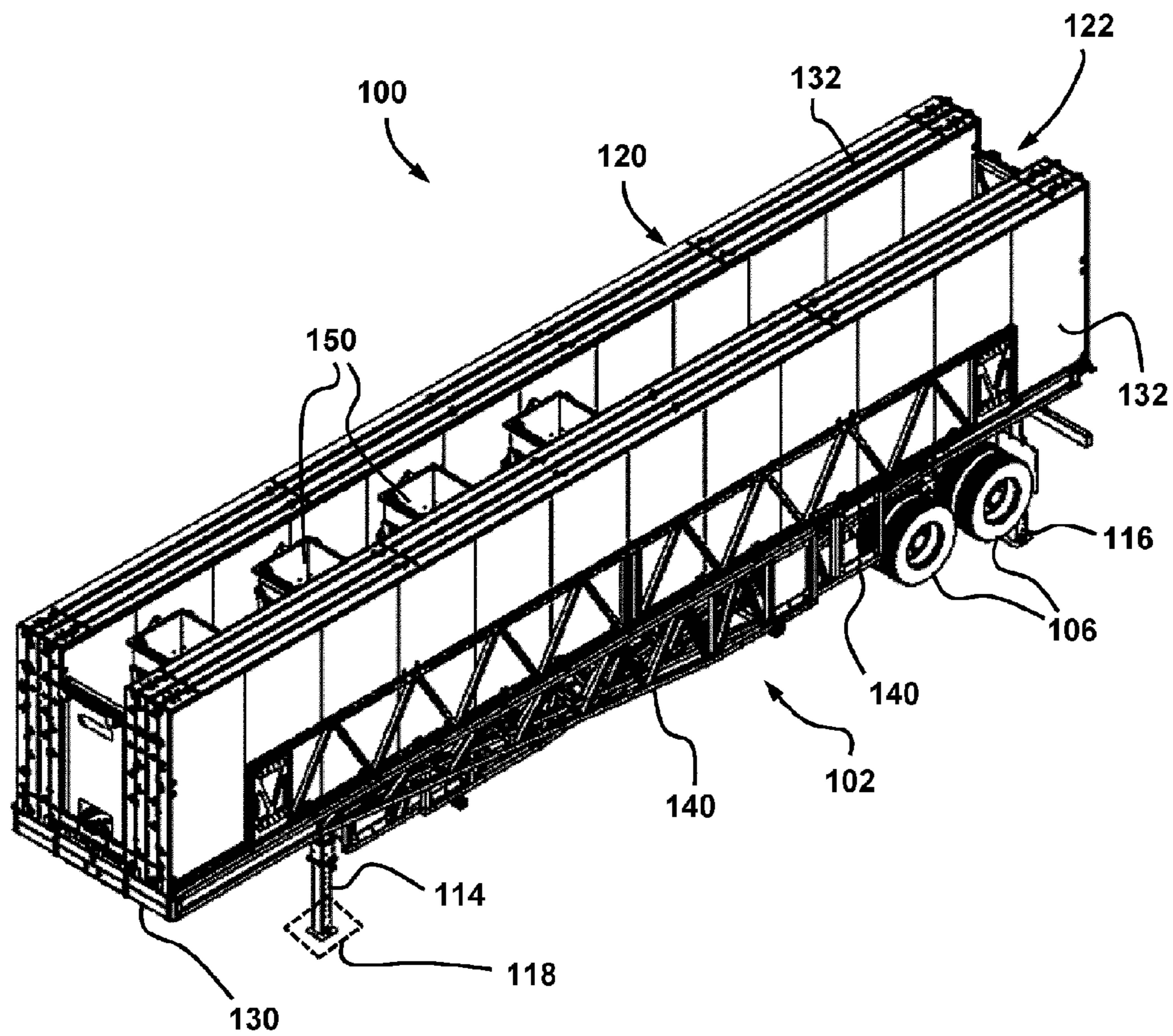


FIG. 3

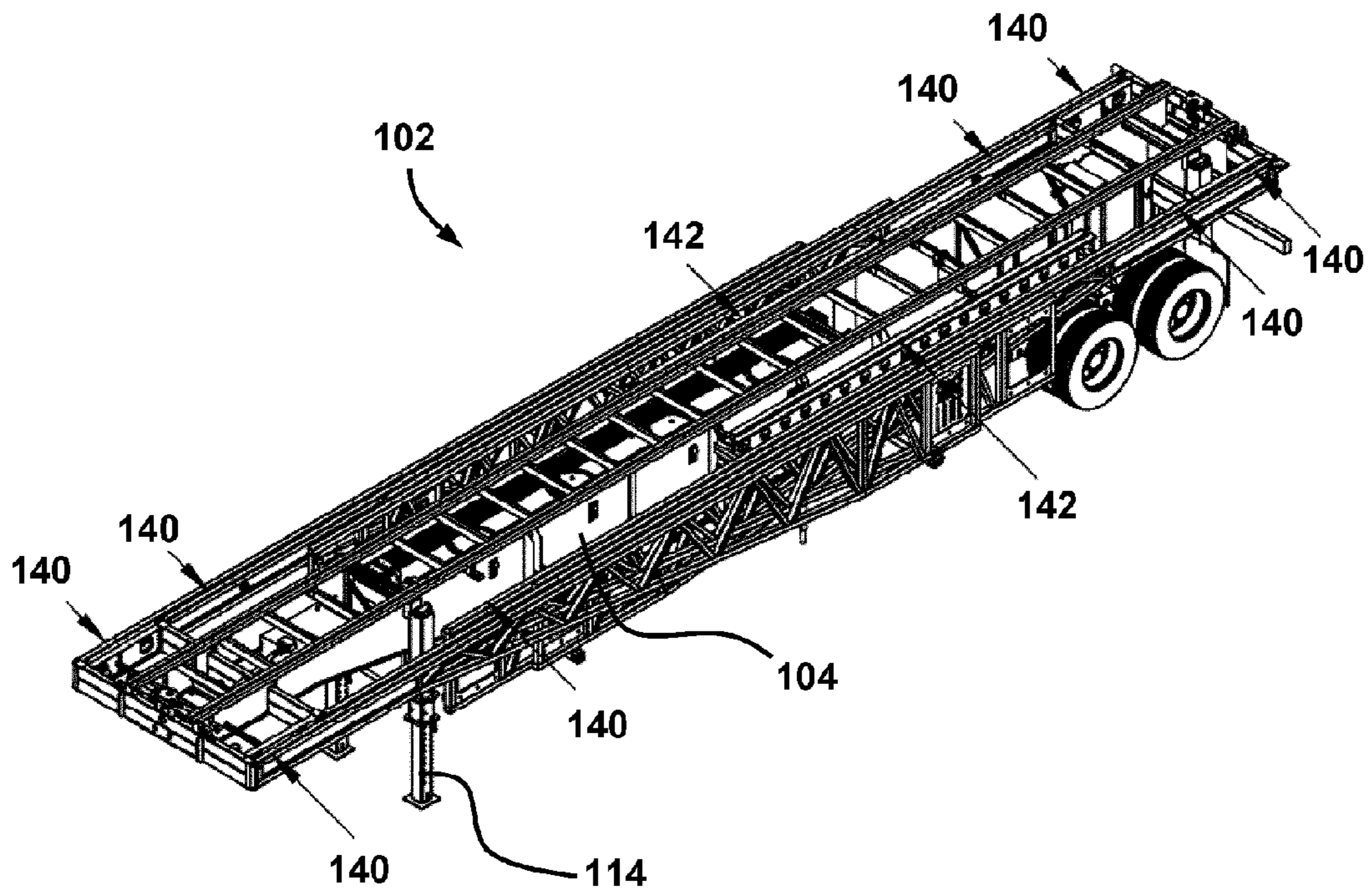


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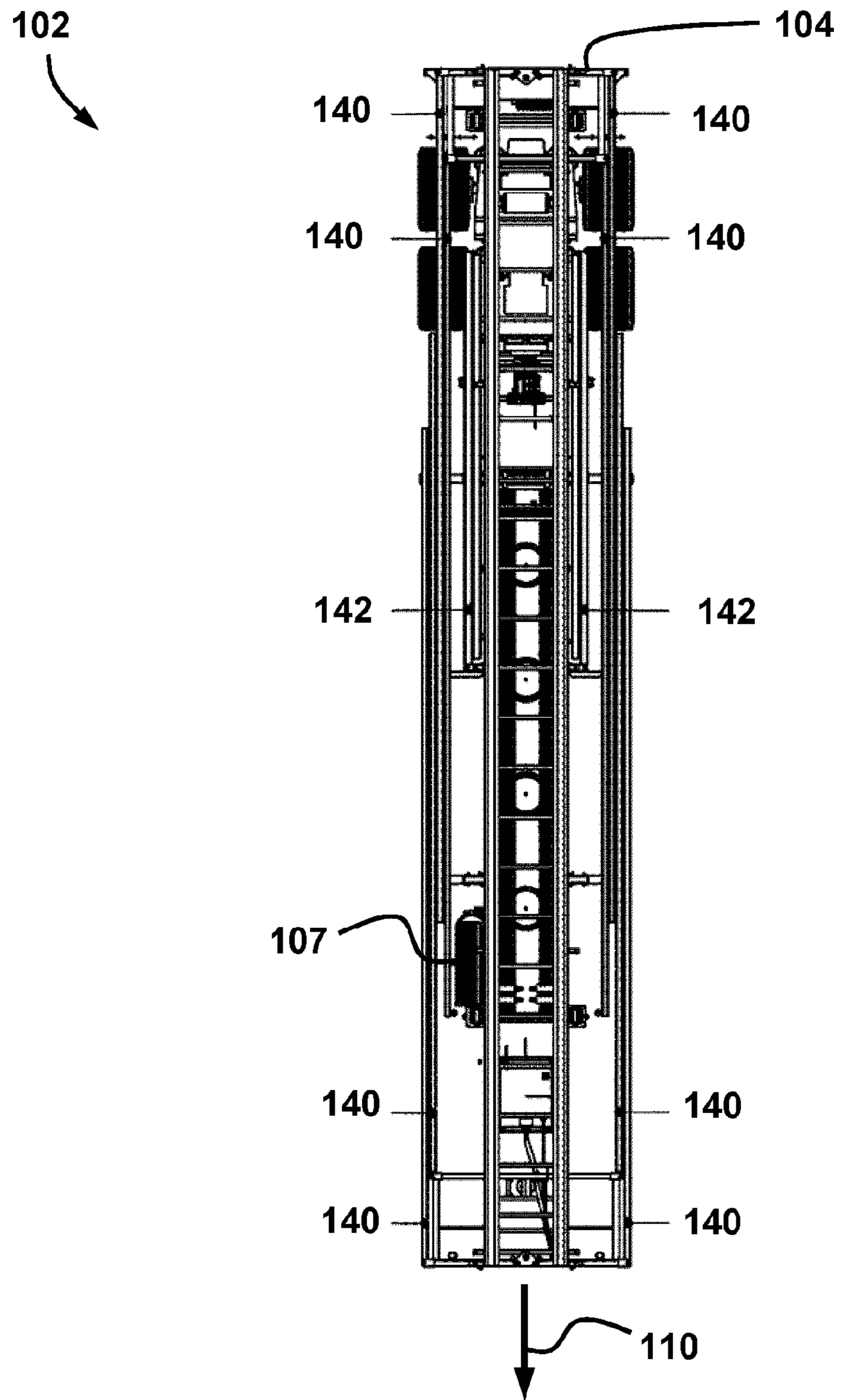


FIG. 5

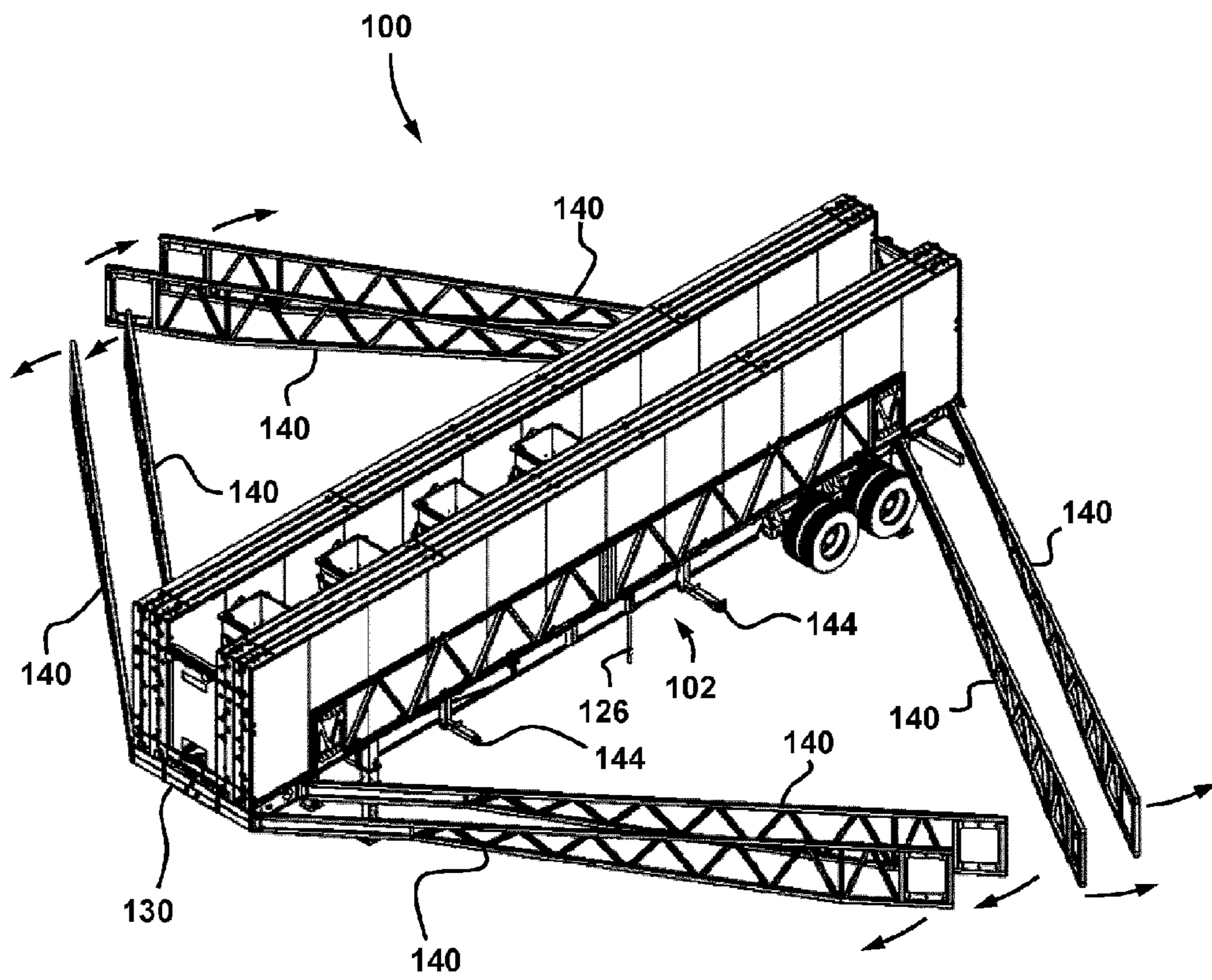


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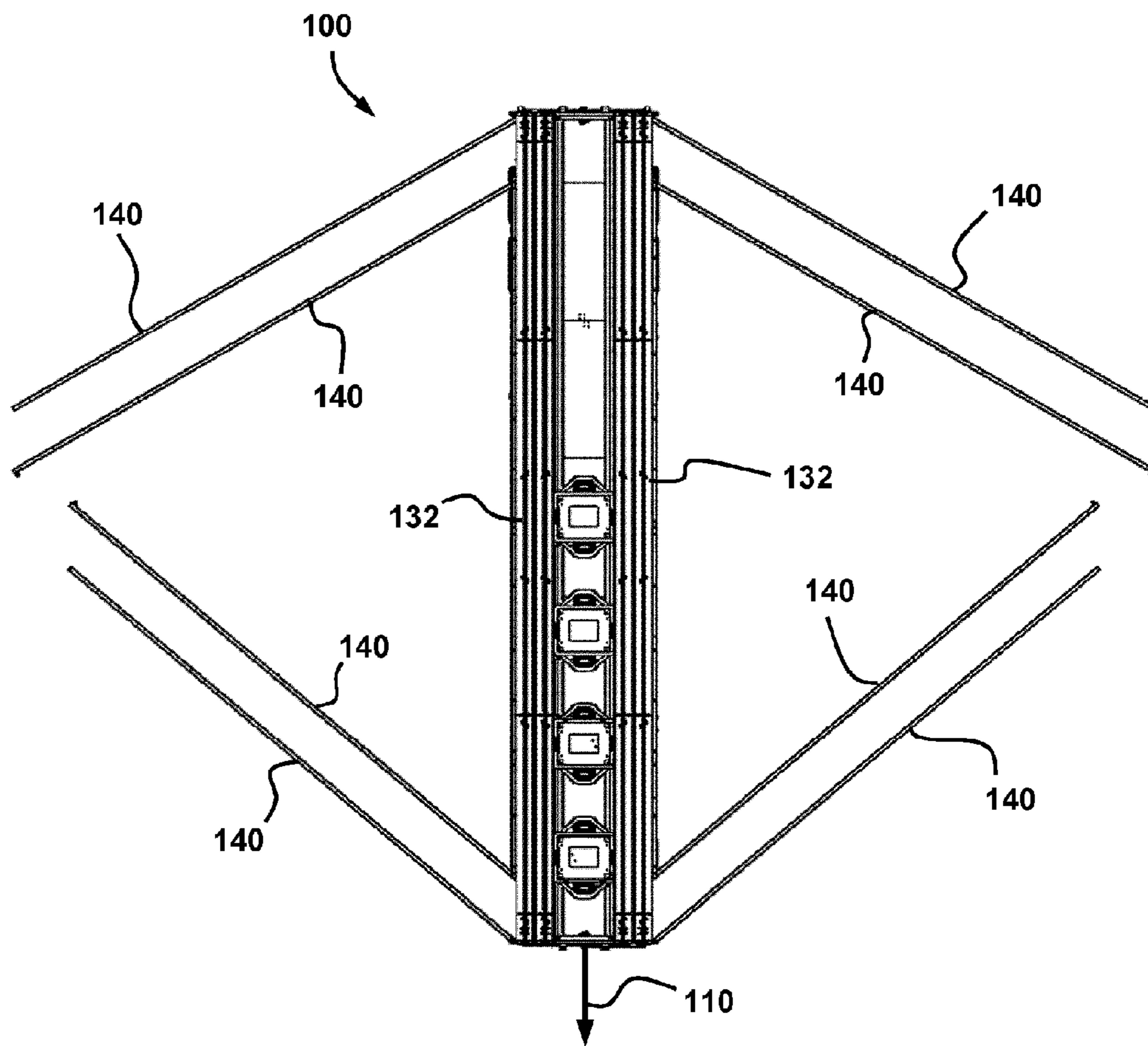


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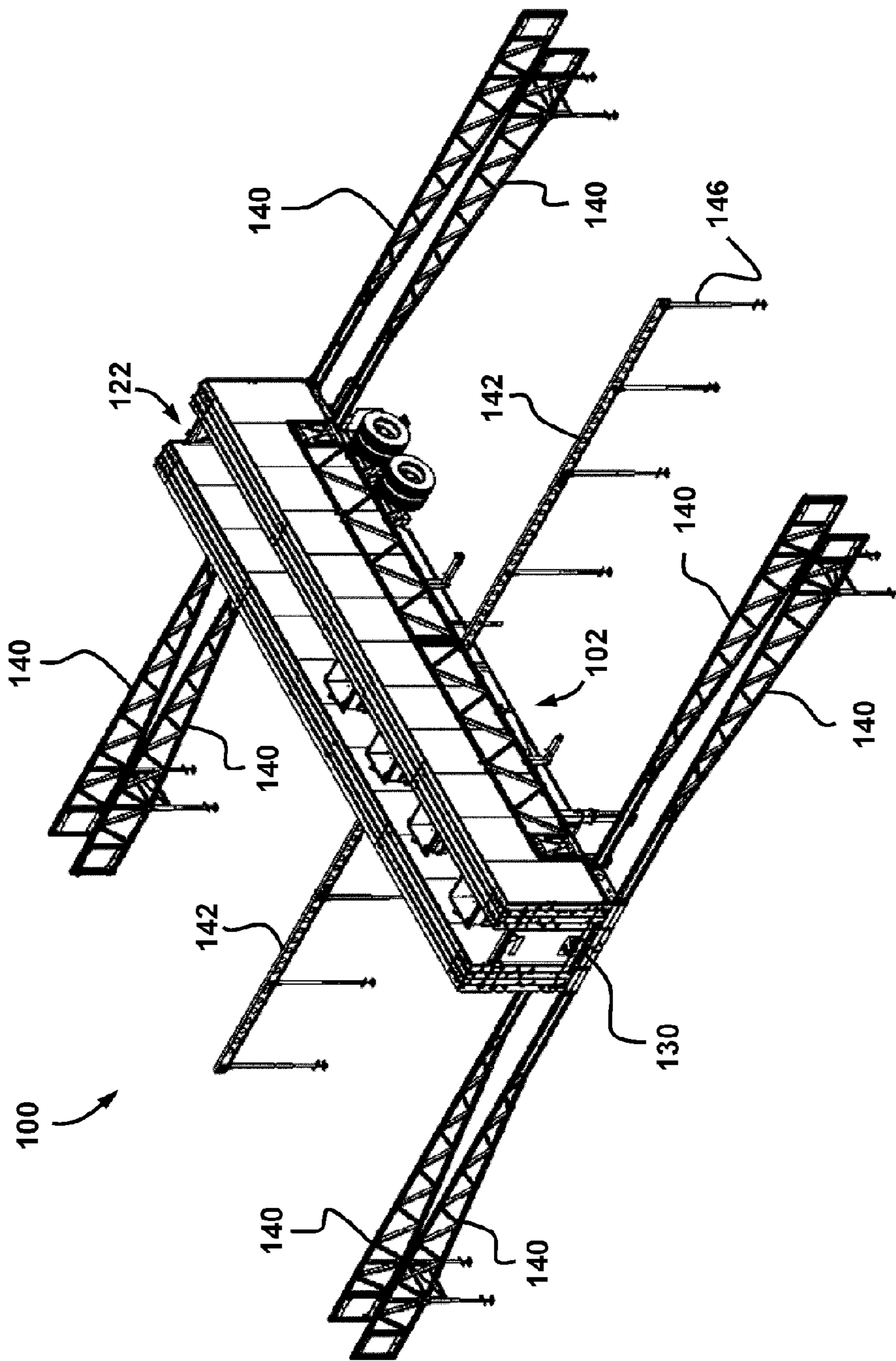


FIG. 8

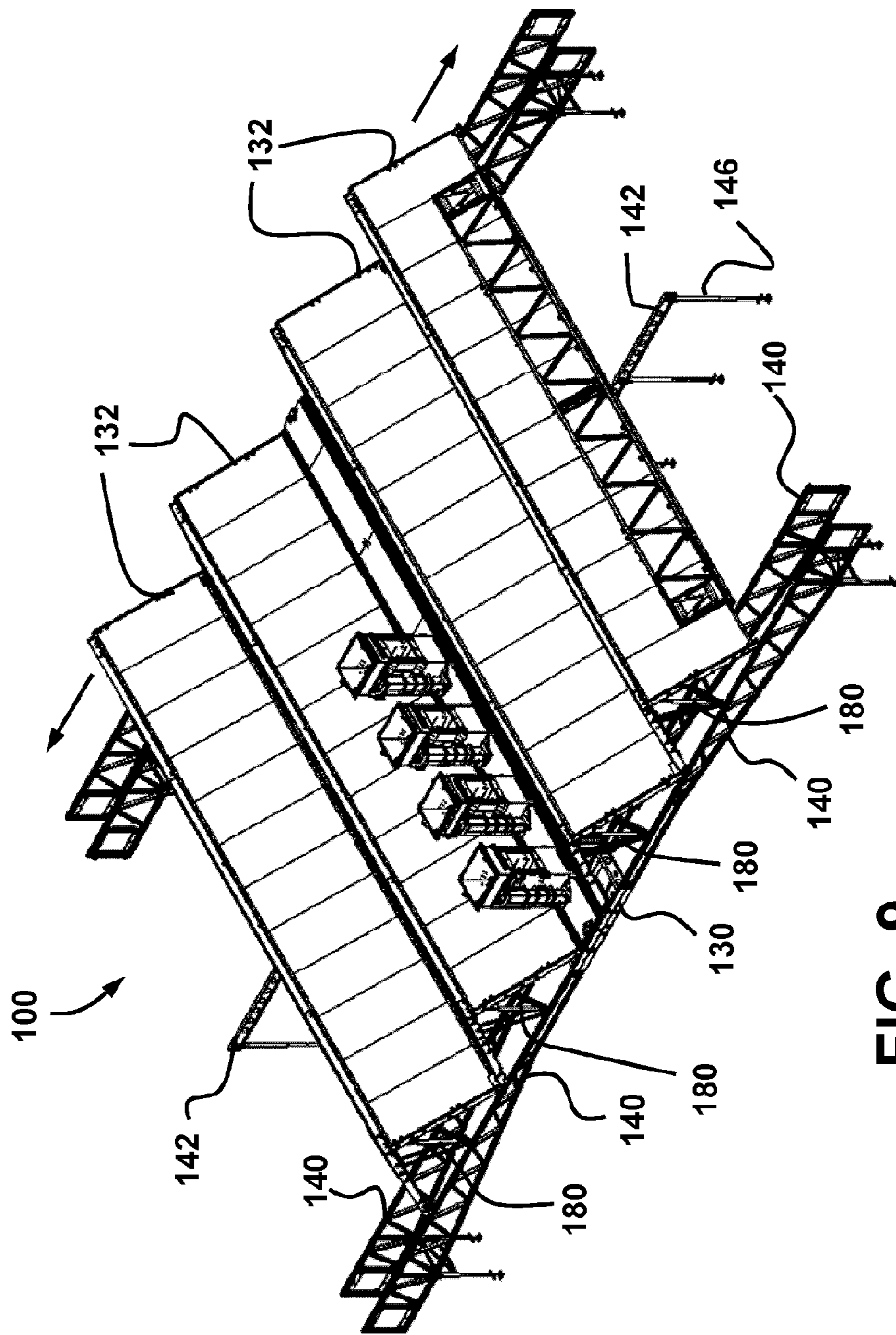


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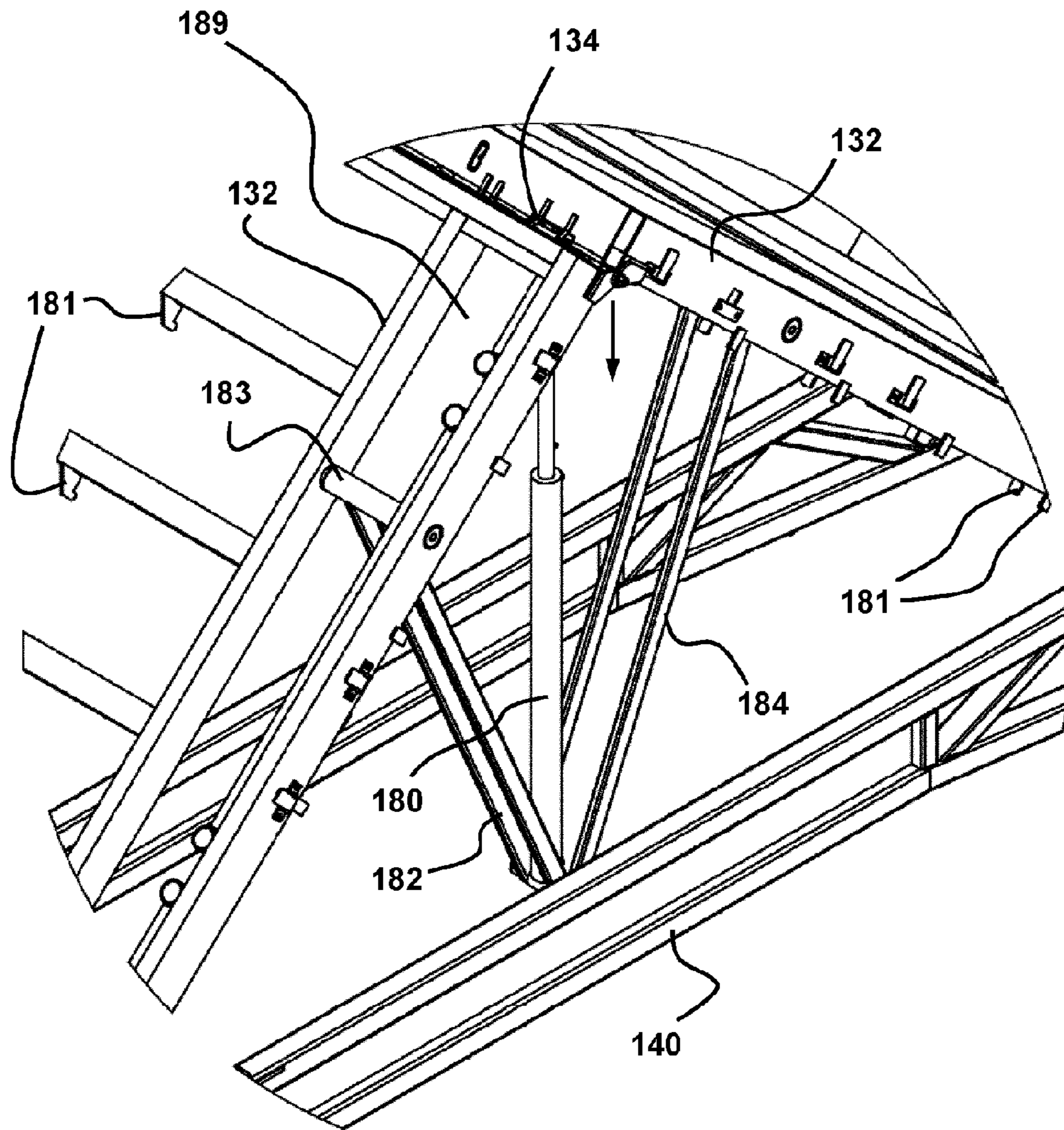


FIG. 10

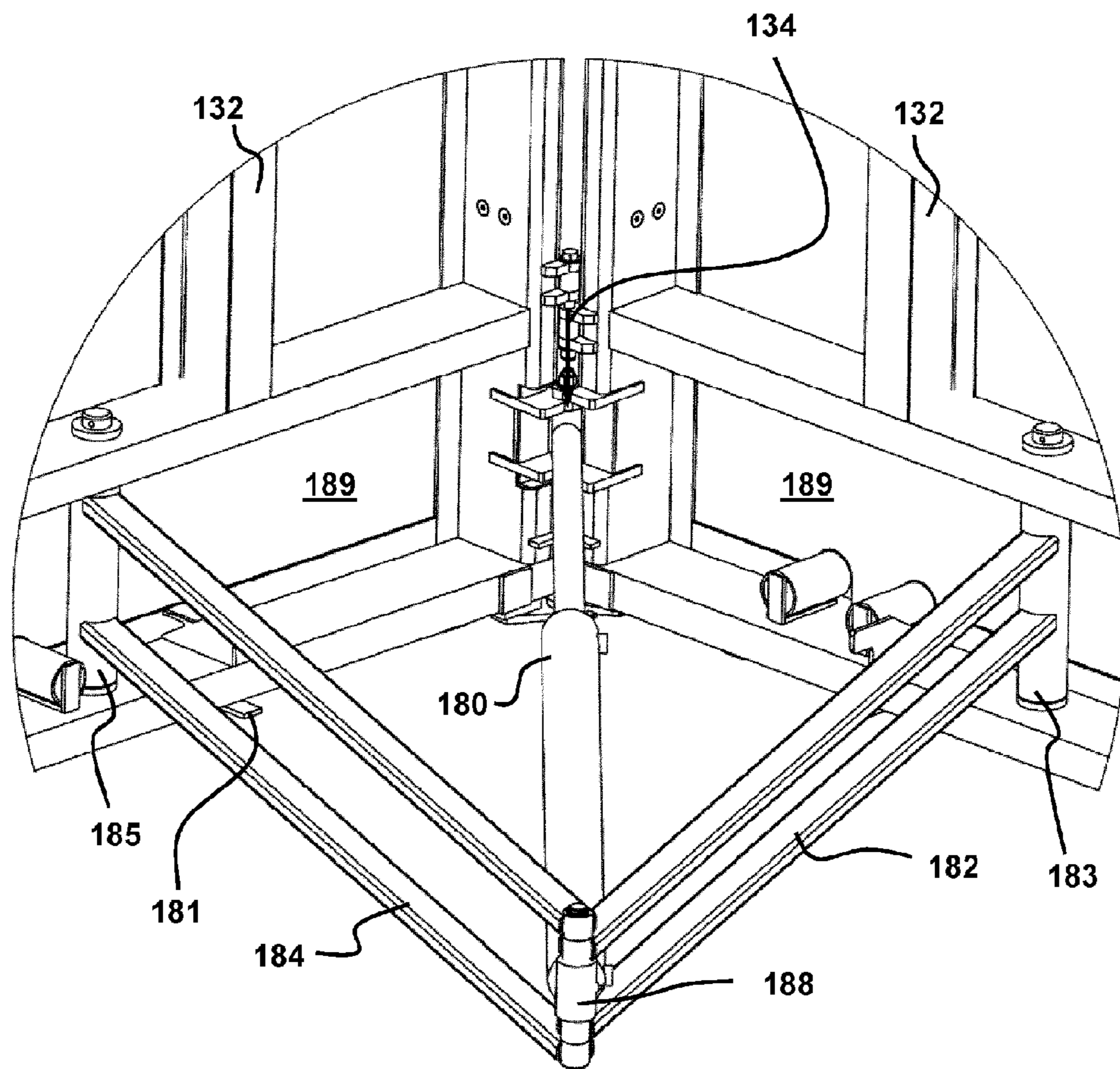


FIG. 11

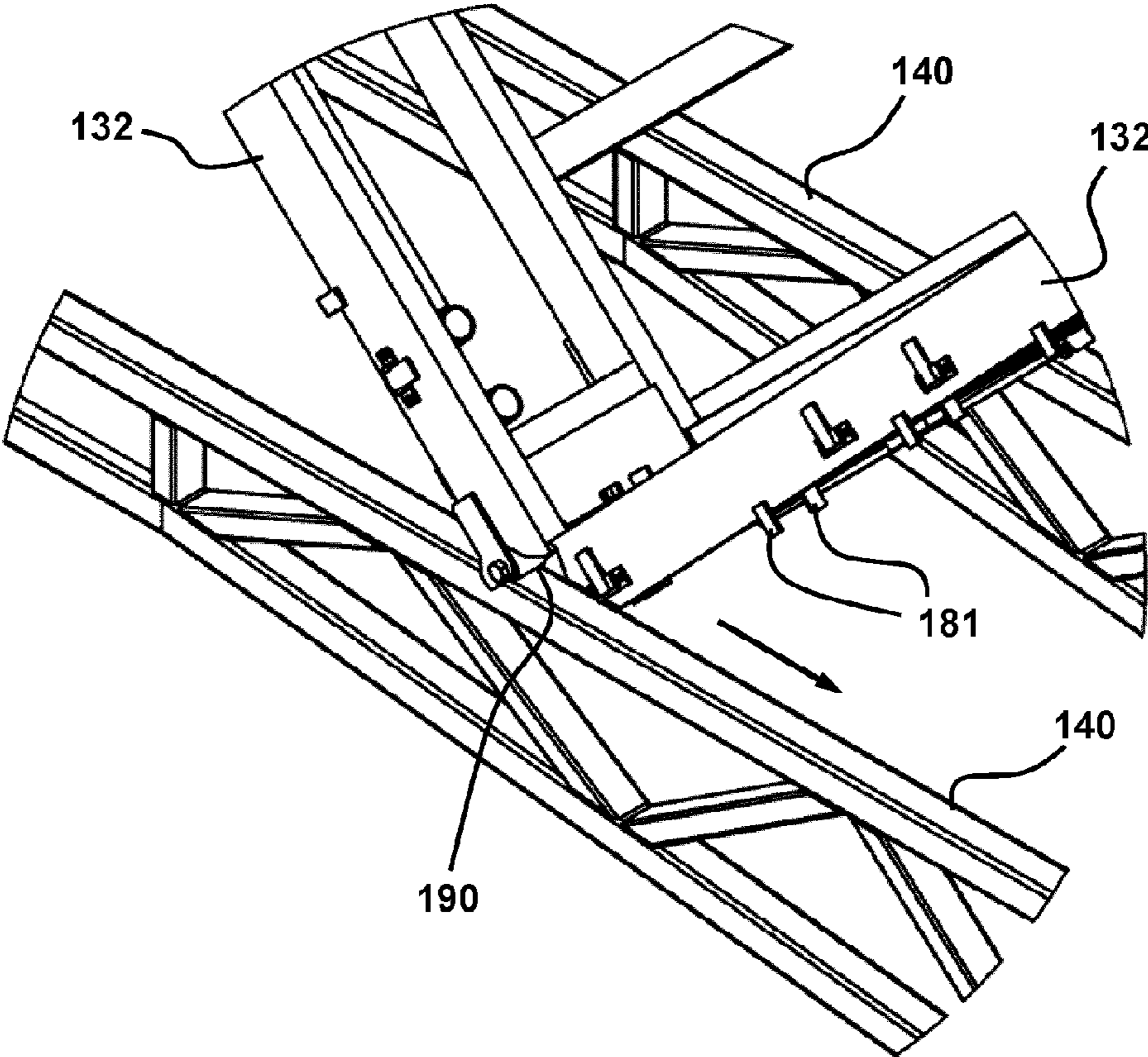


FIG. 12

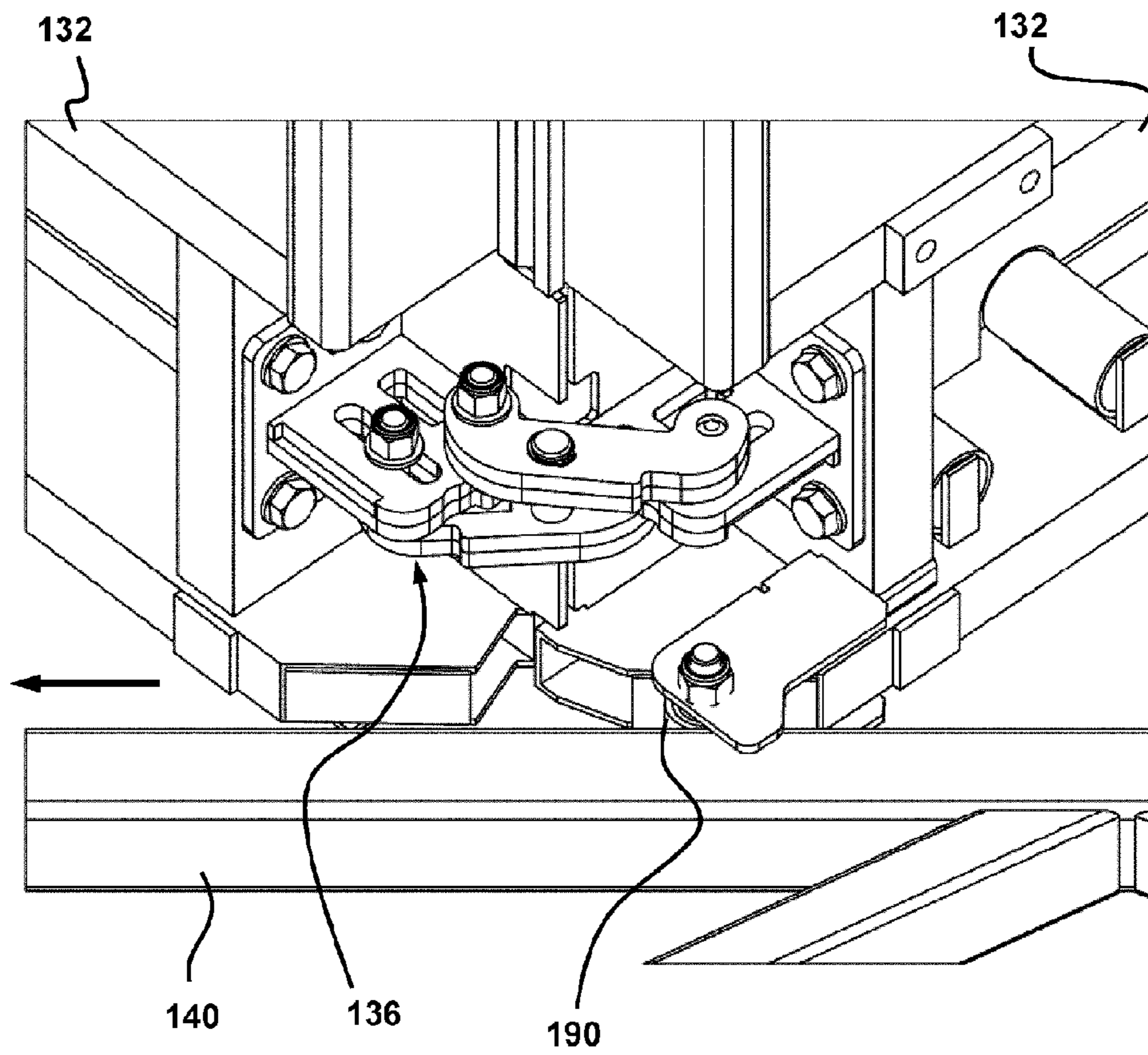


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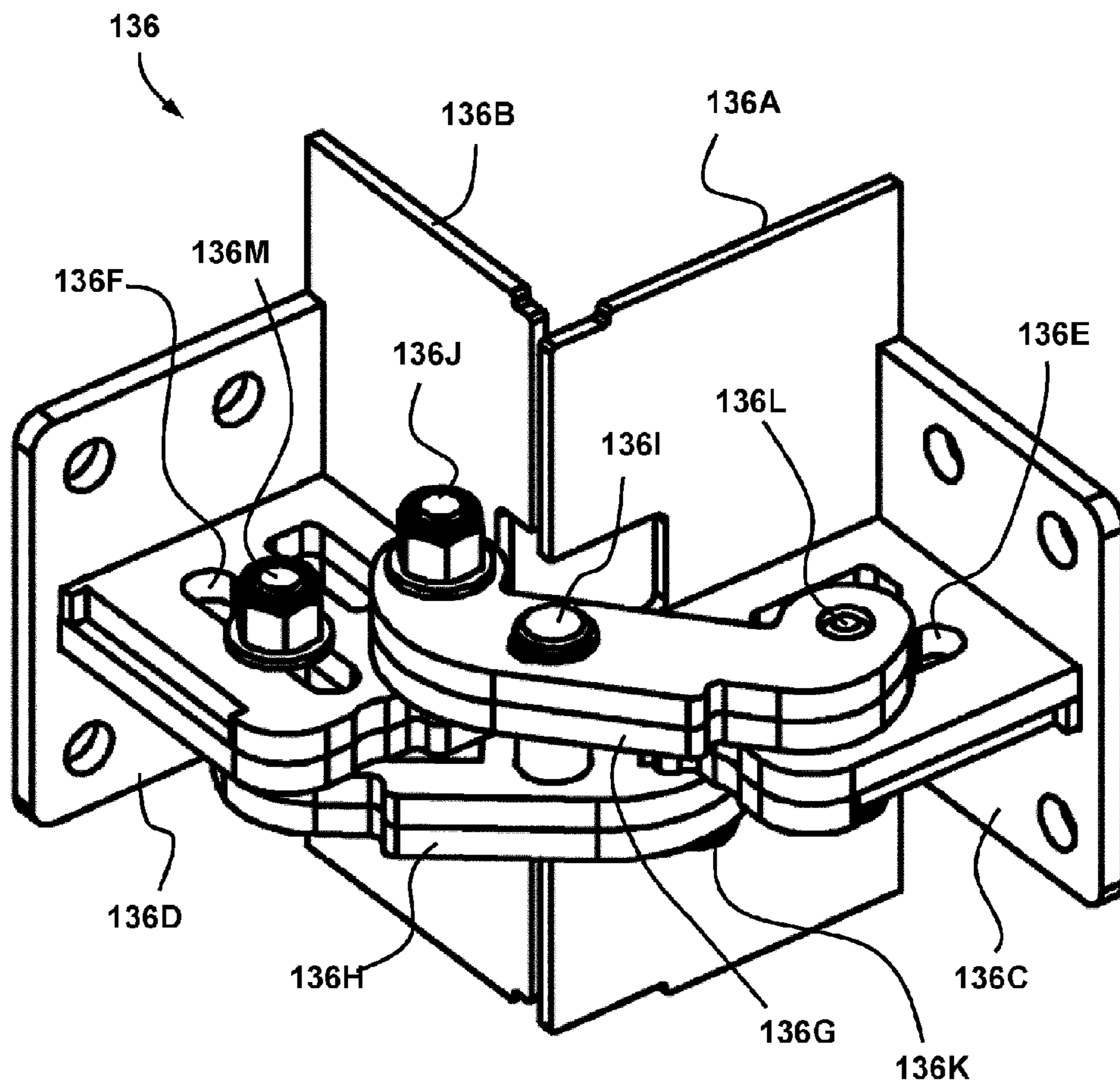


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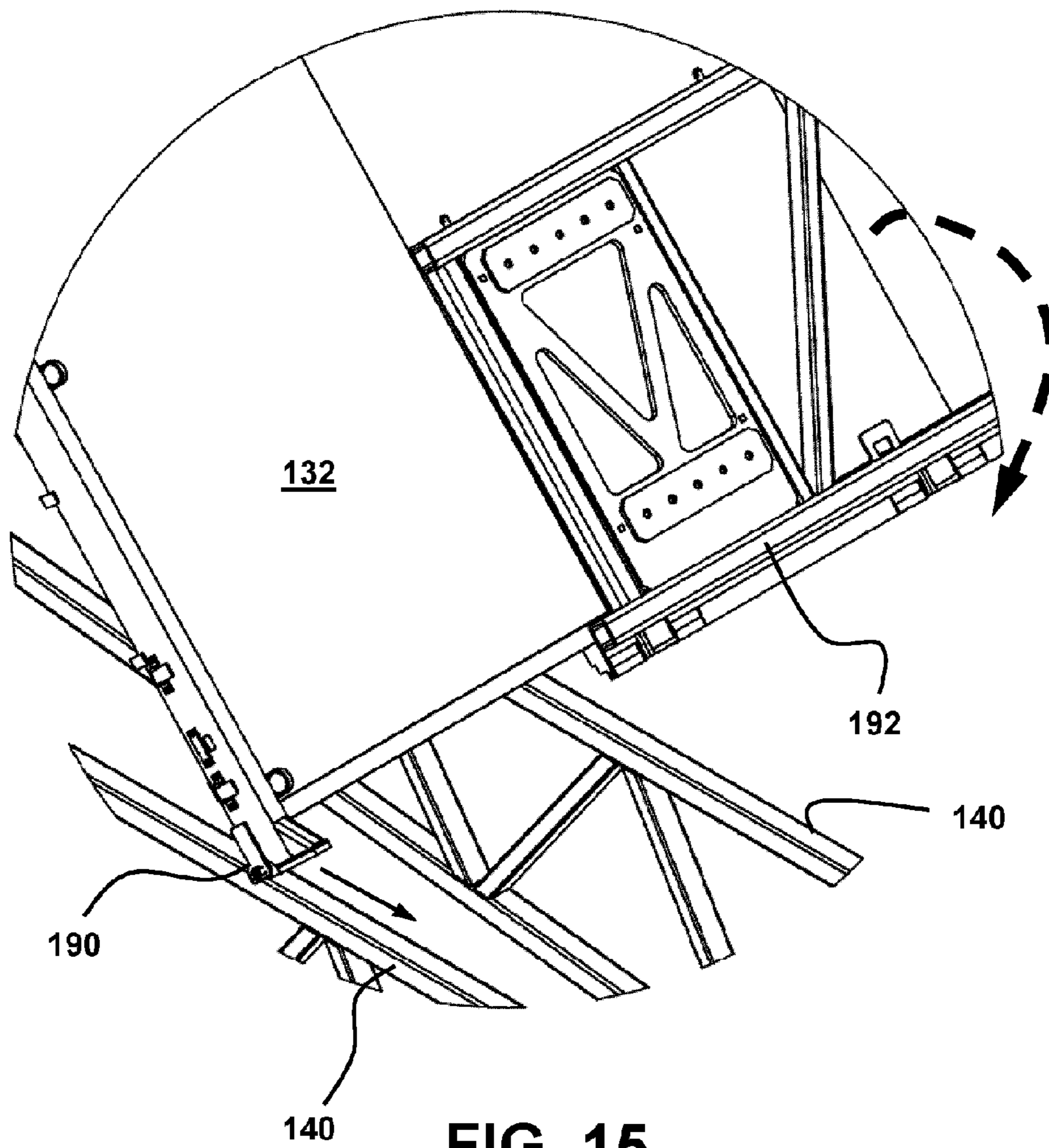


FIG. 15

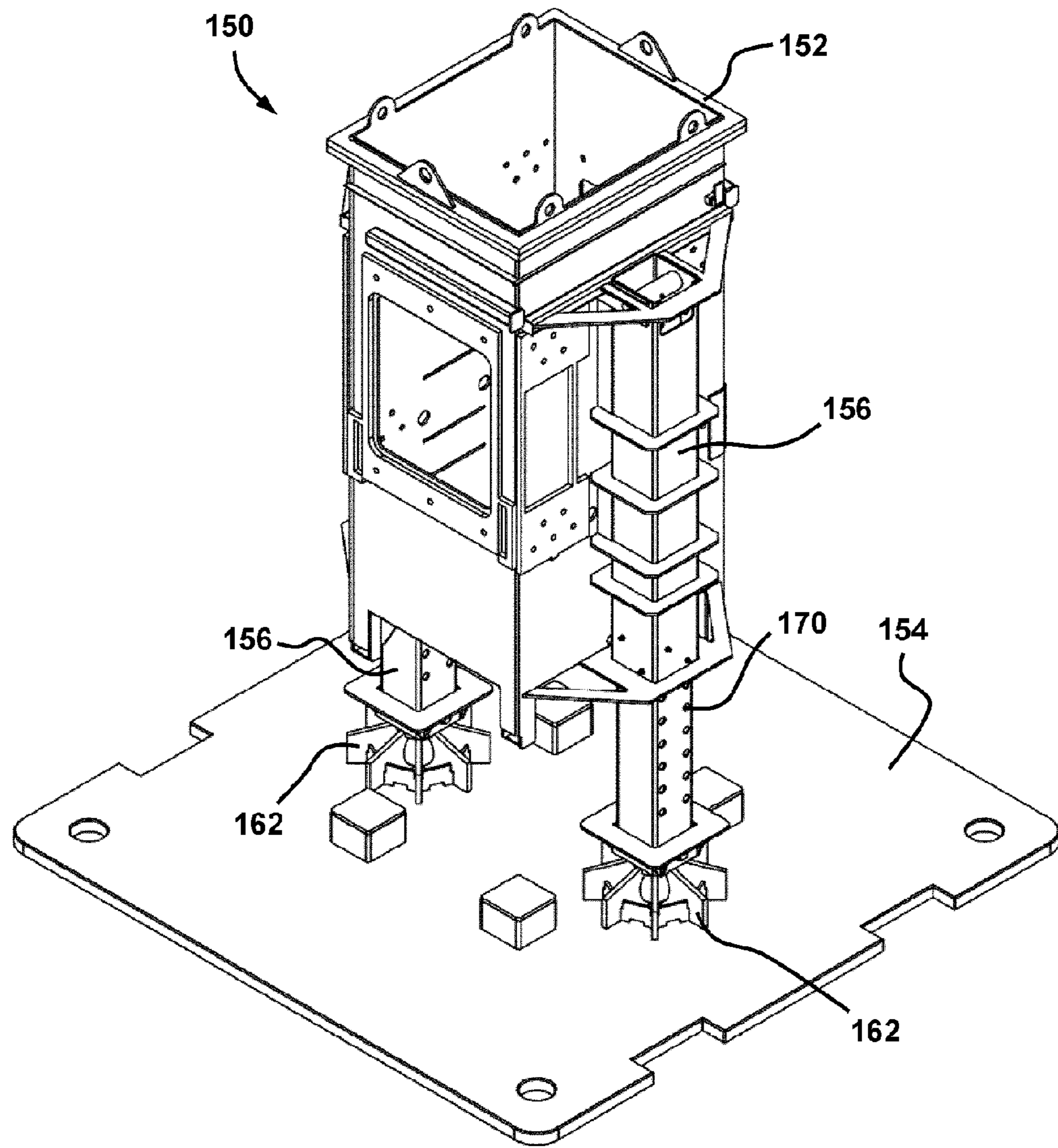


FIG. 16

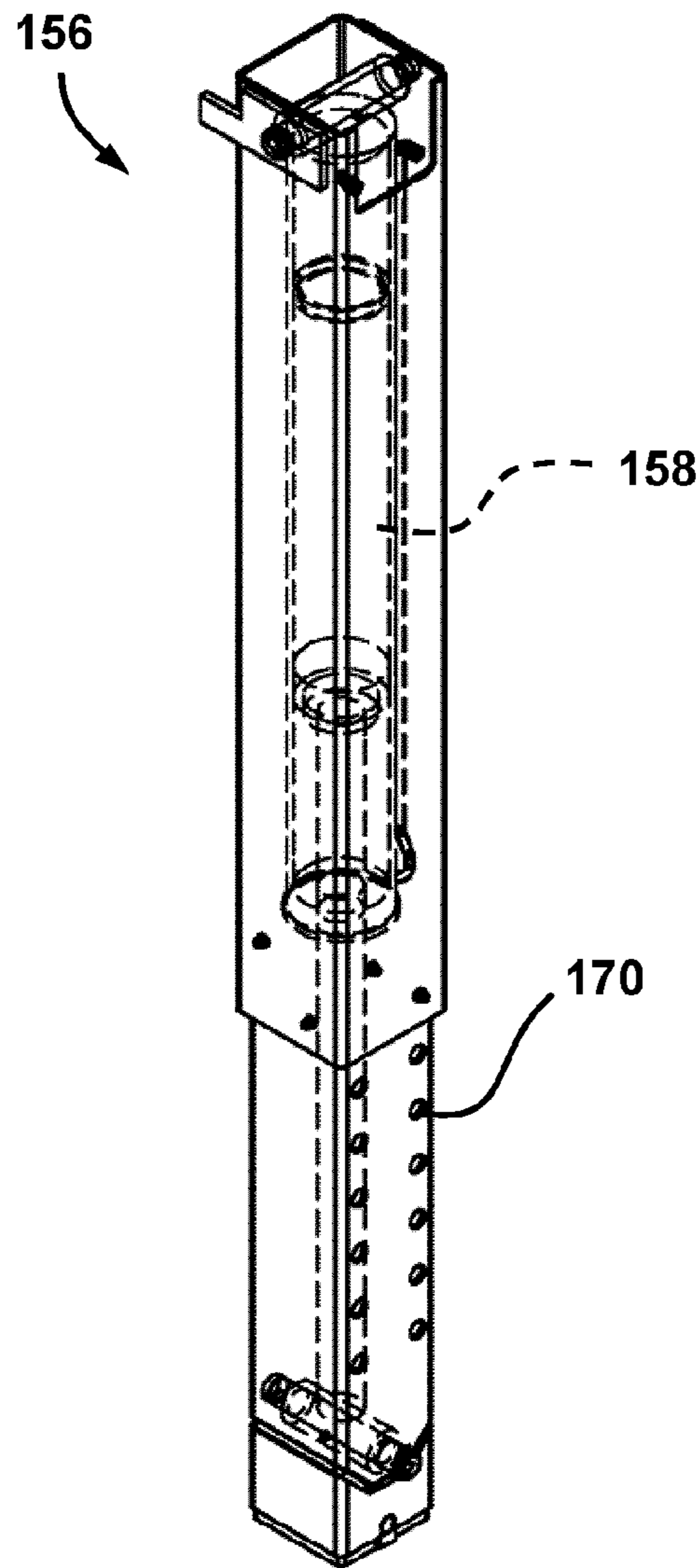


FIG. 17

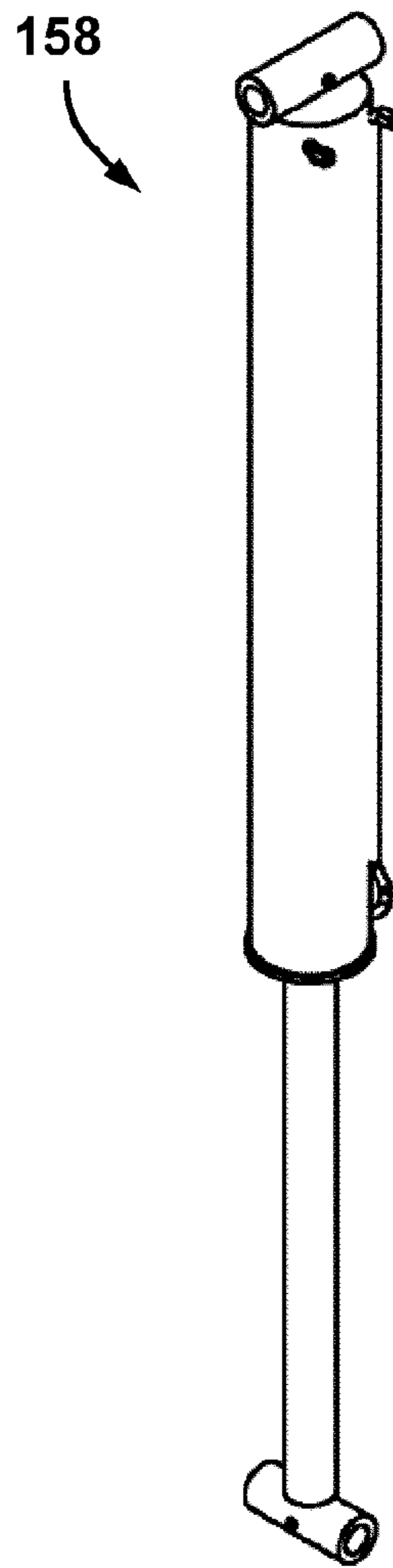


FIG. 18

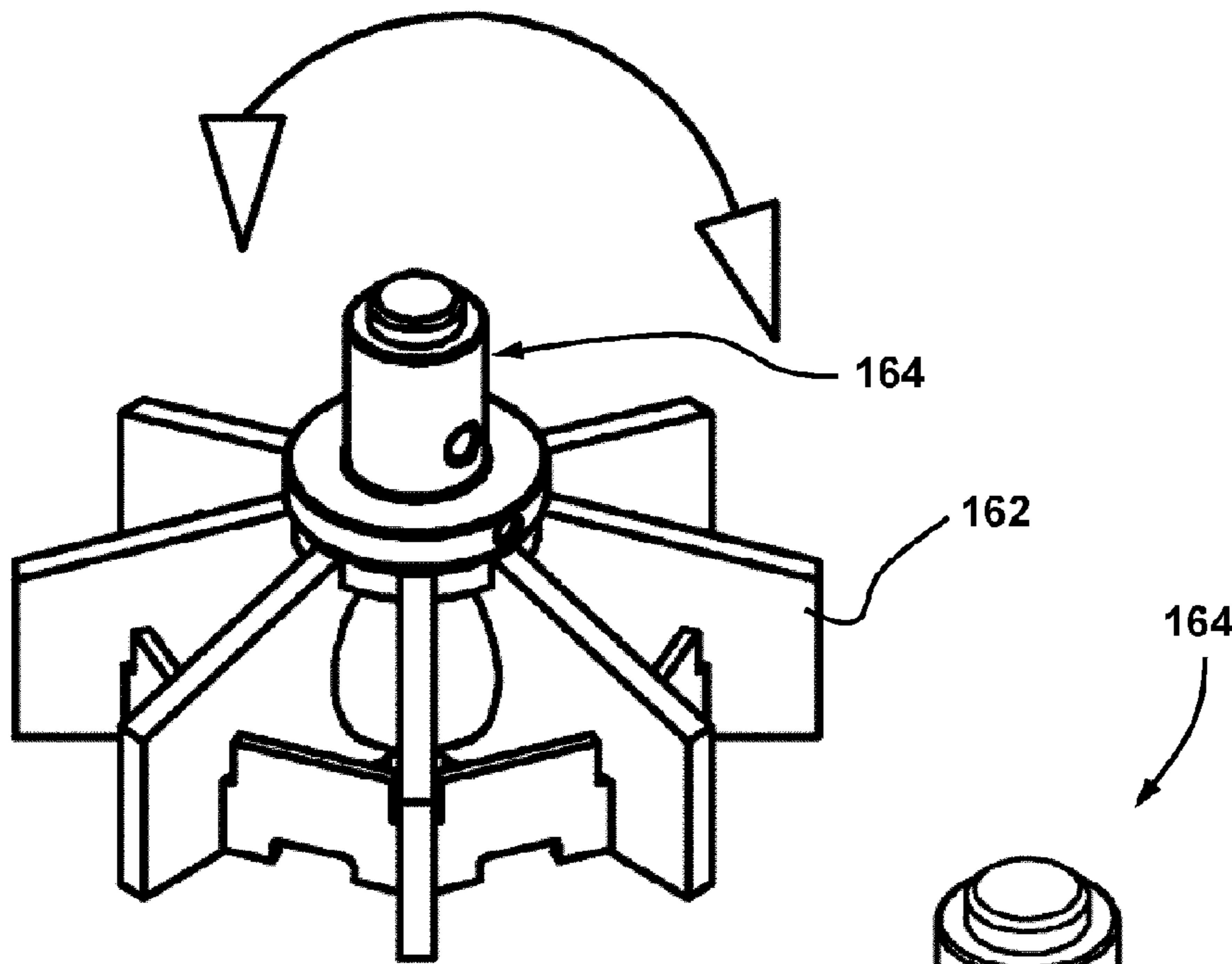


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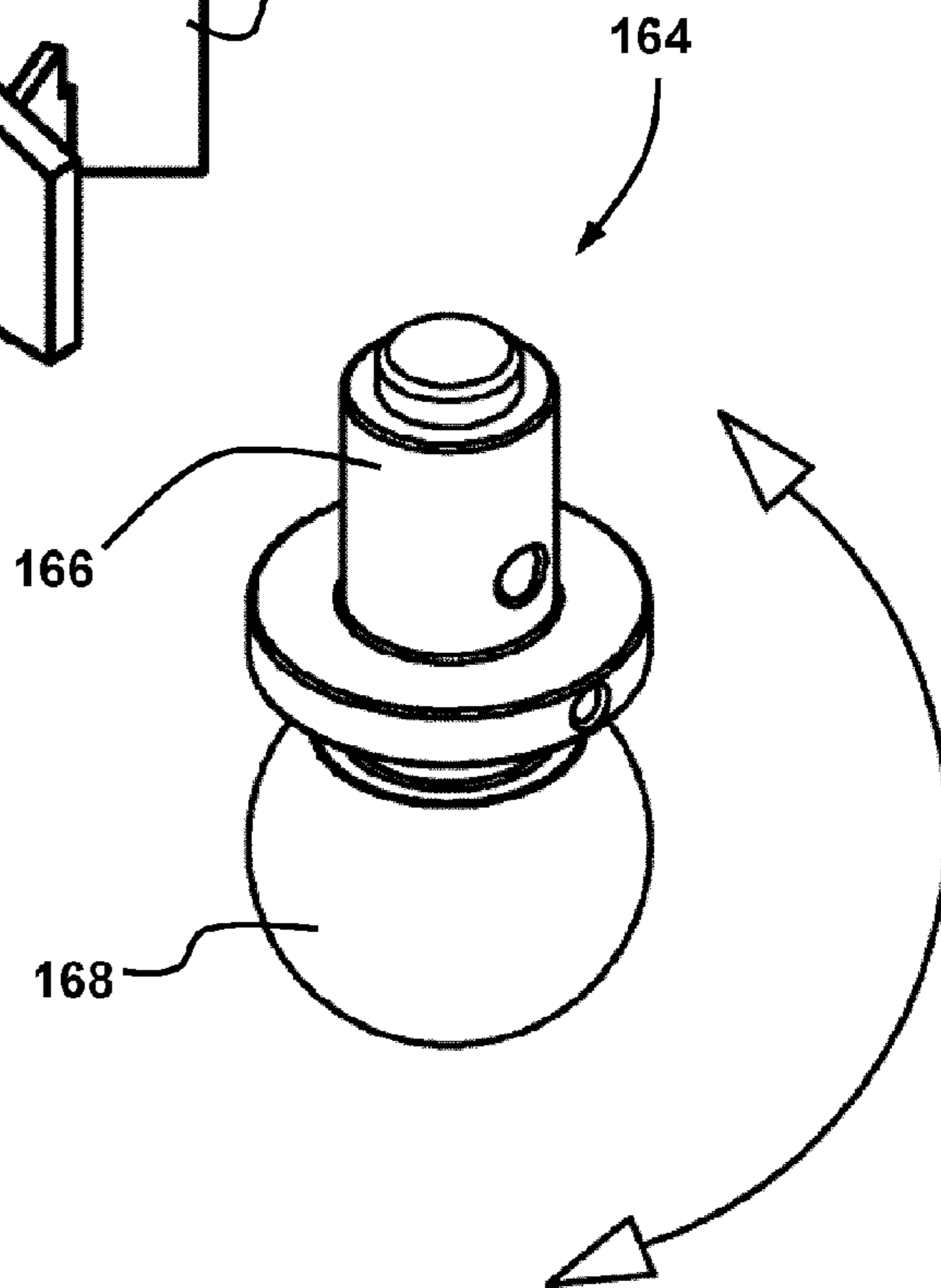


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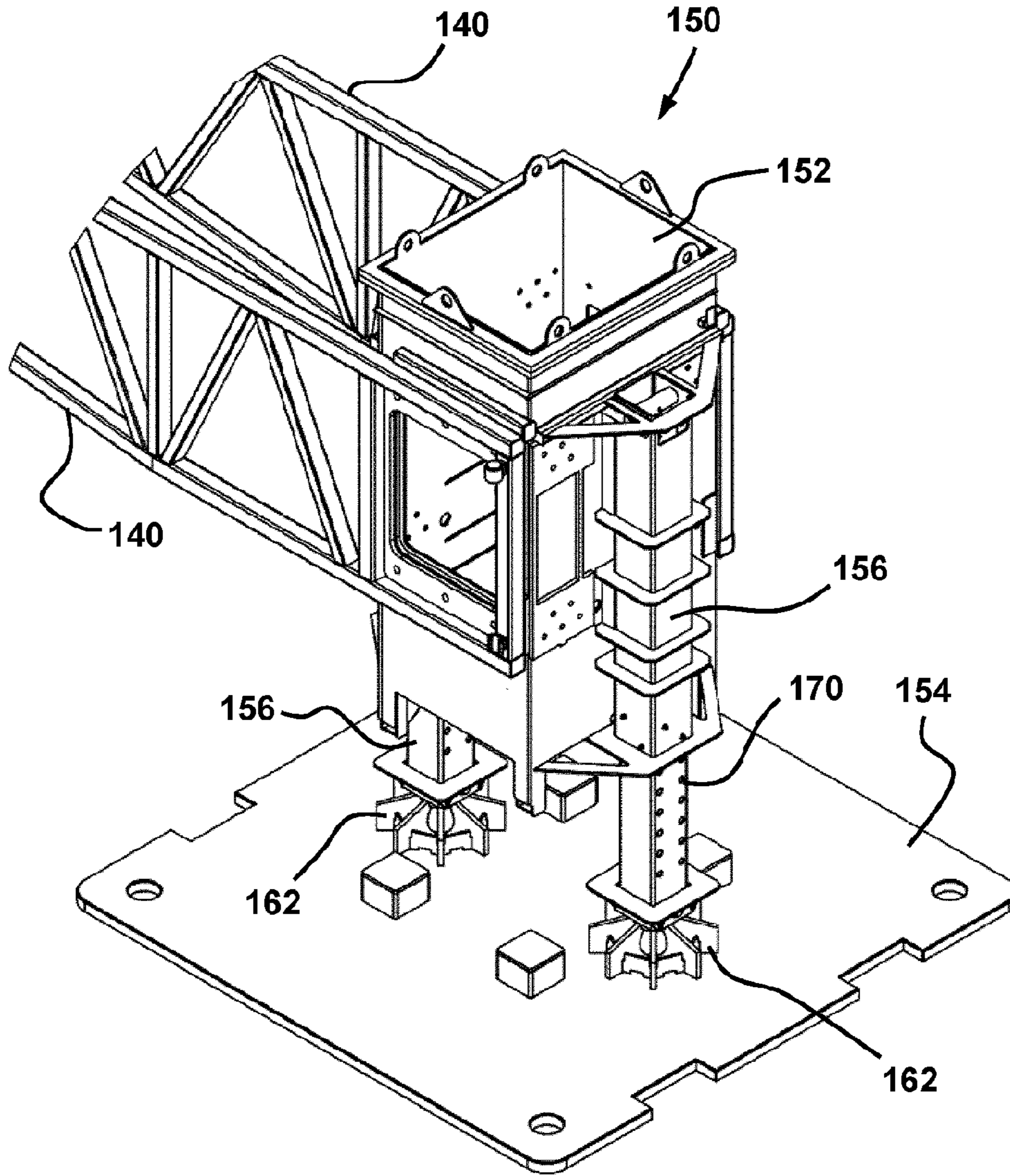


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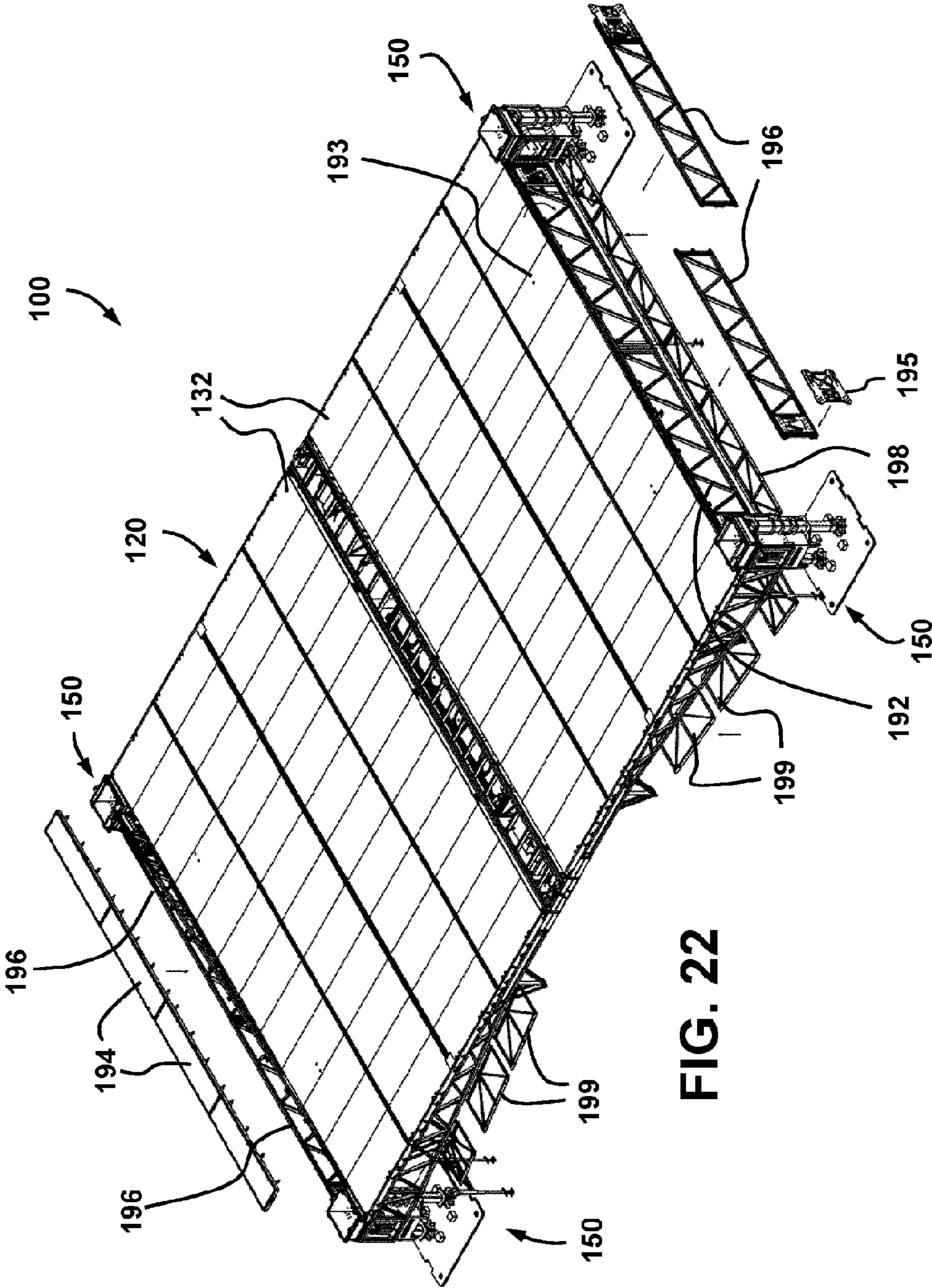


FIG. 22

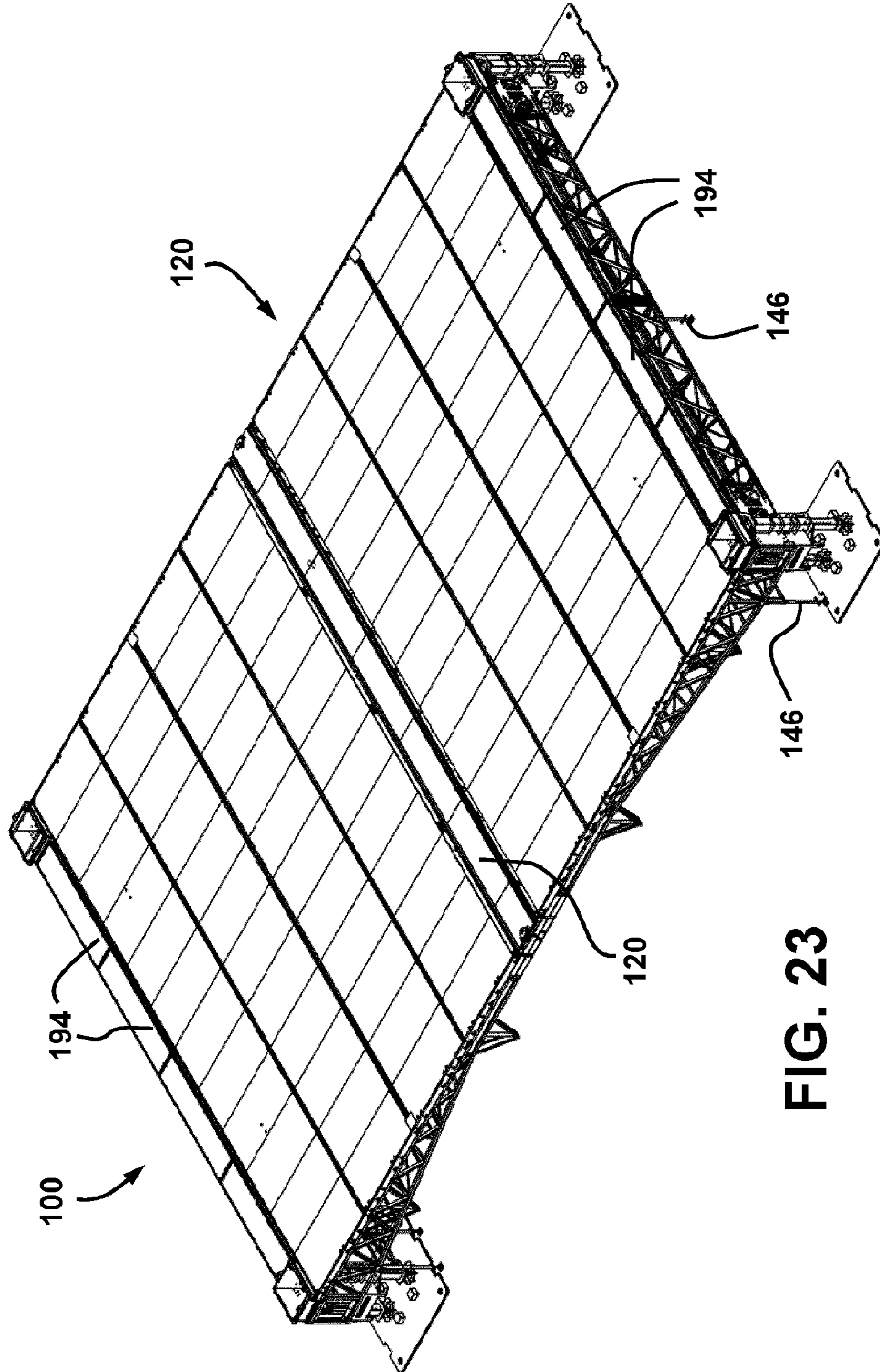


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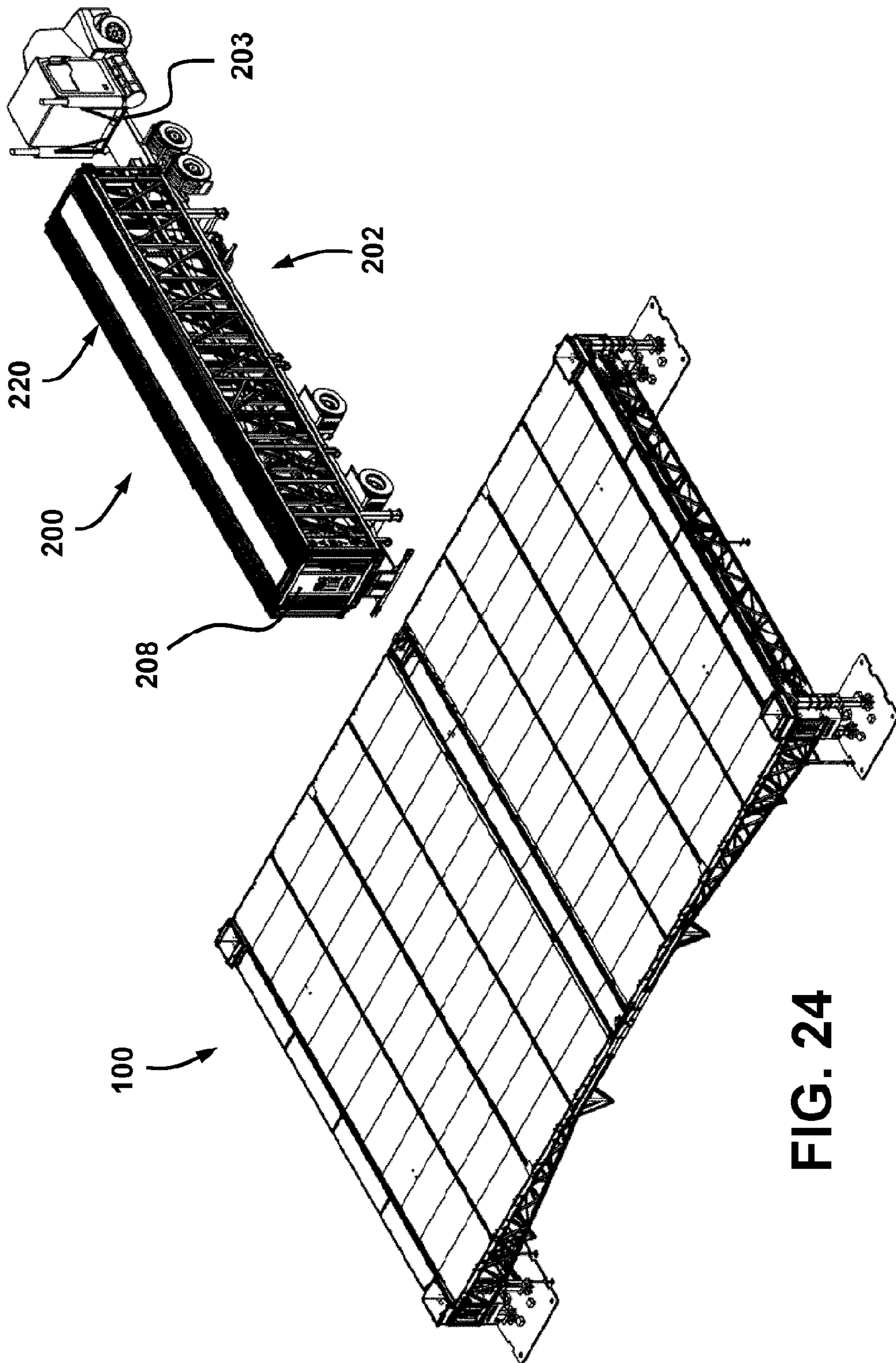


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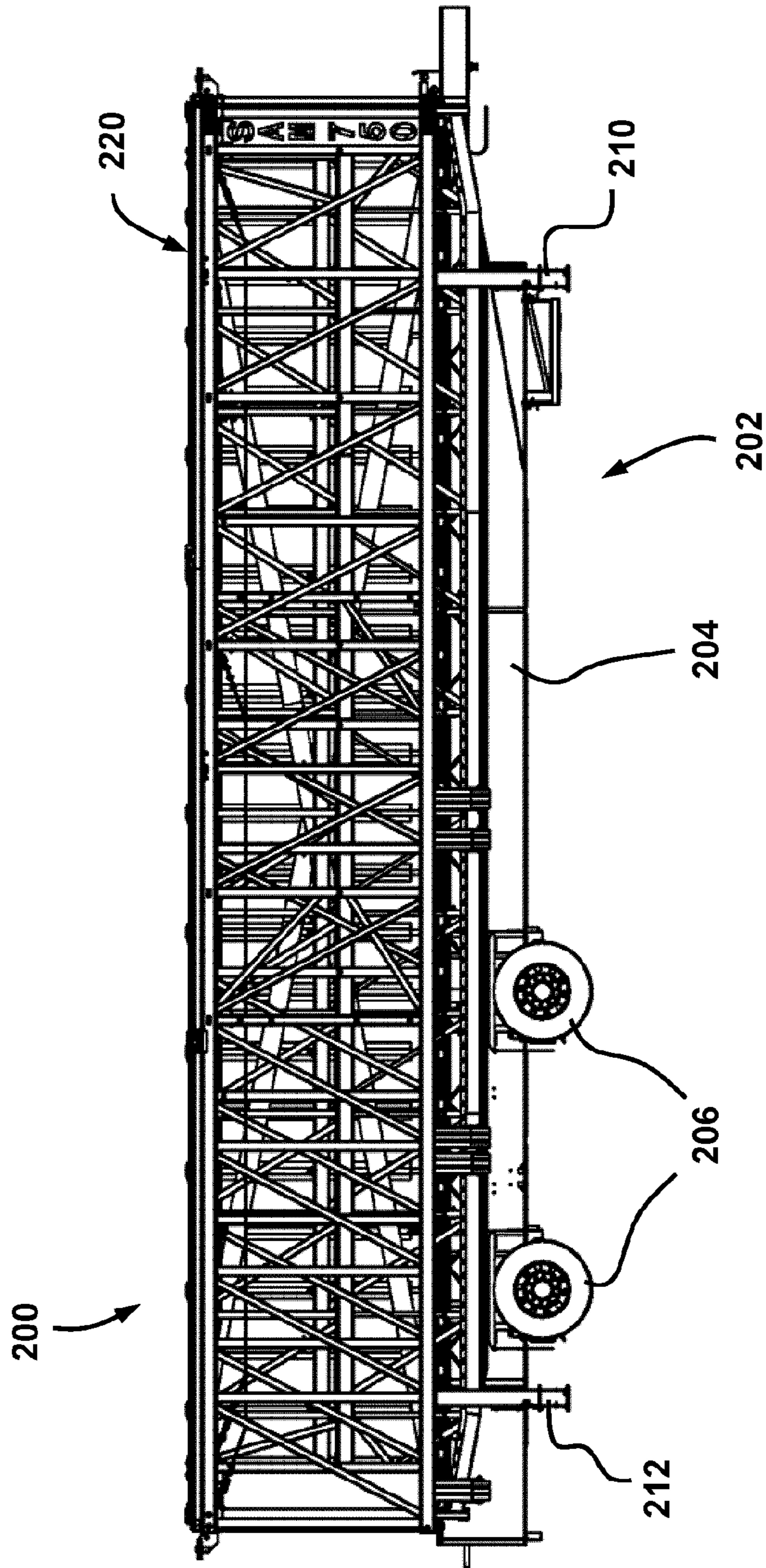


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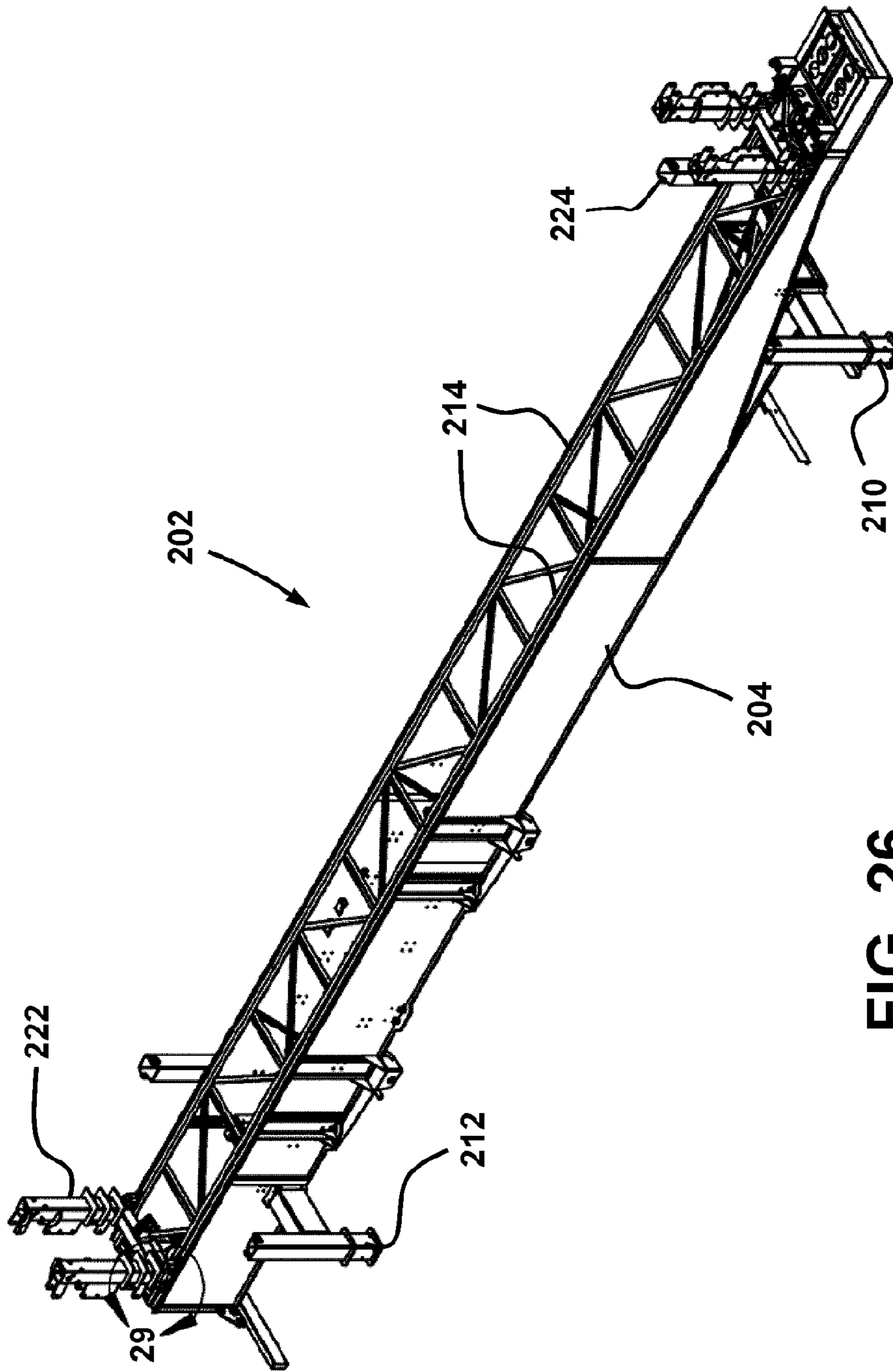


FIG. 26

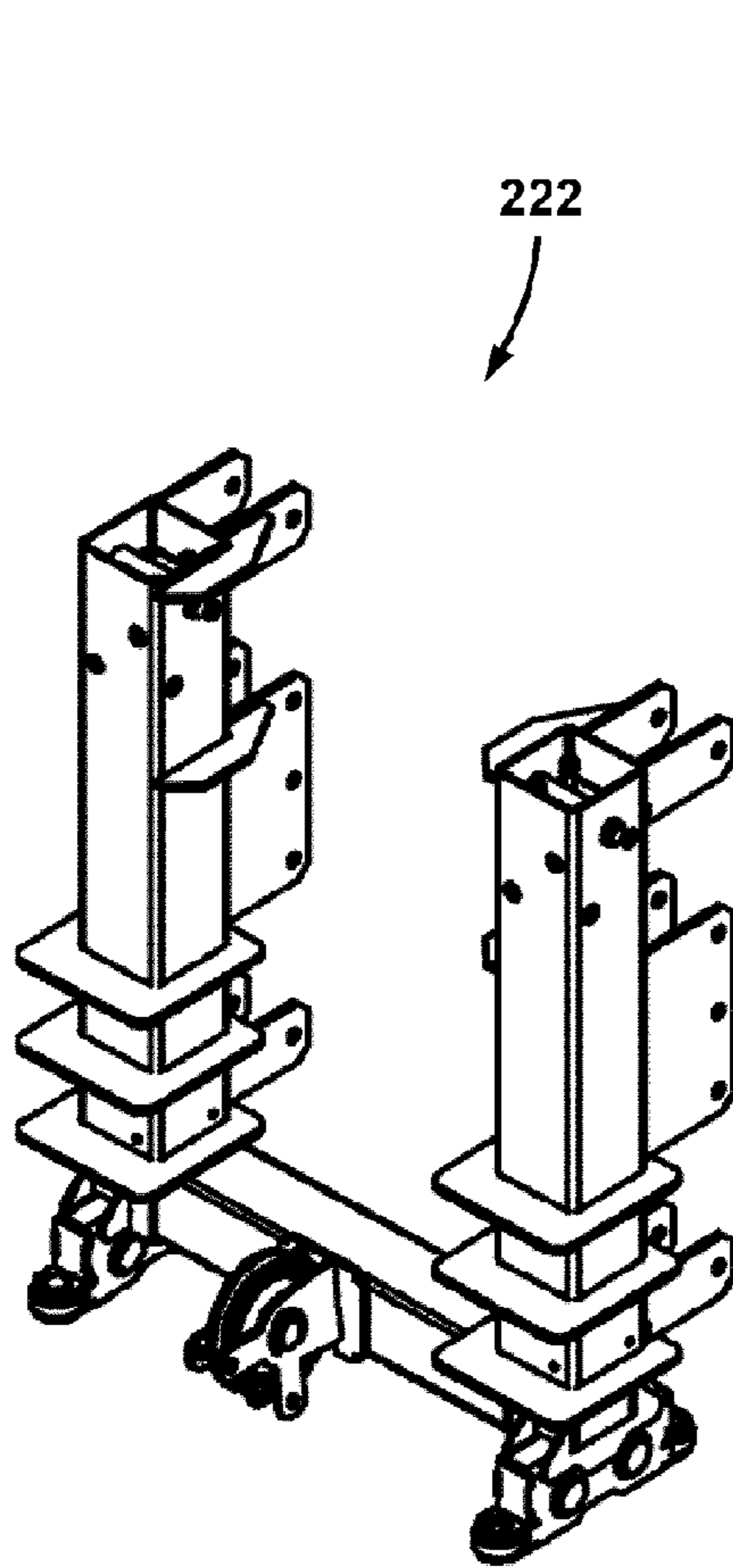


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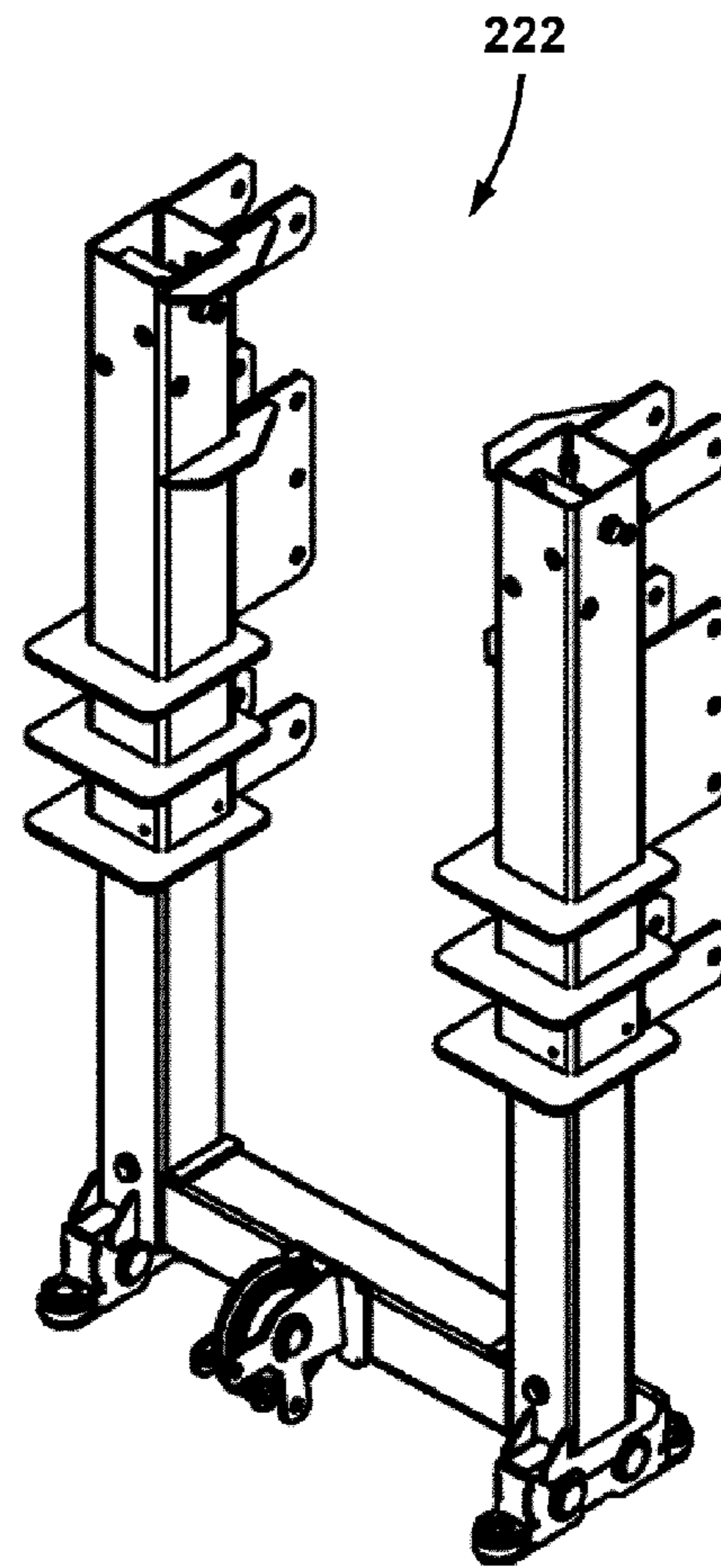


FIG. 28

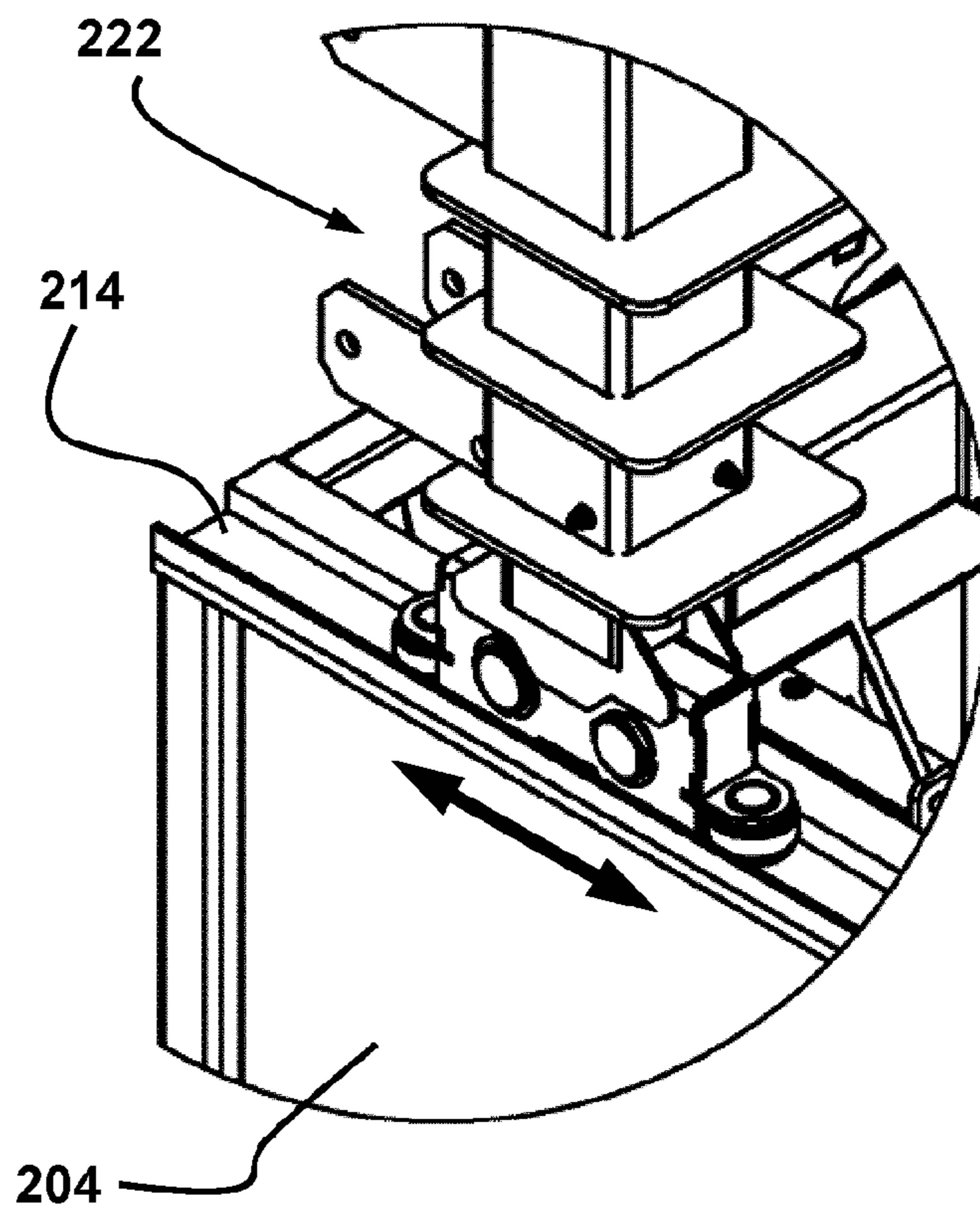


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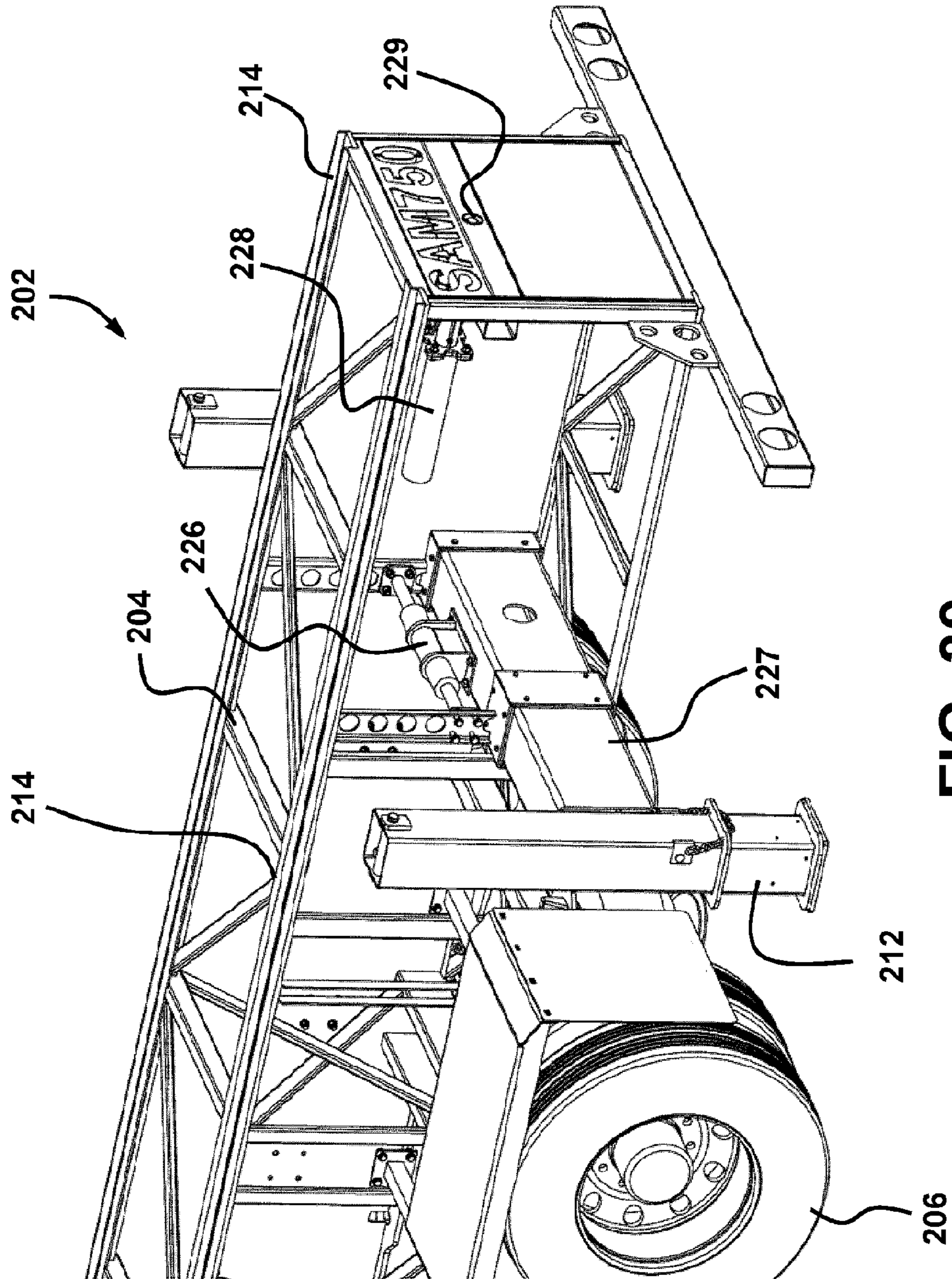


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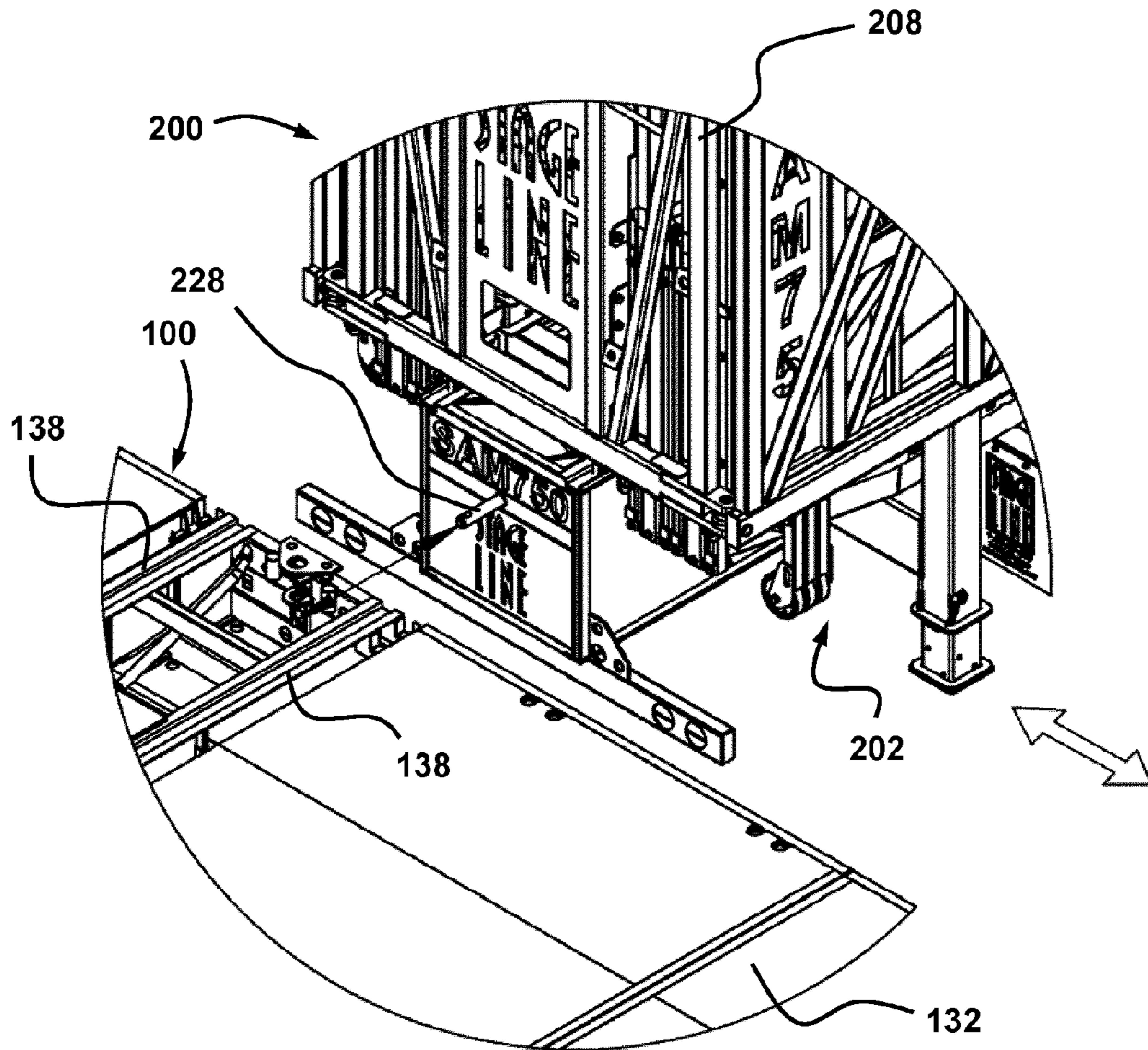


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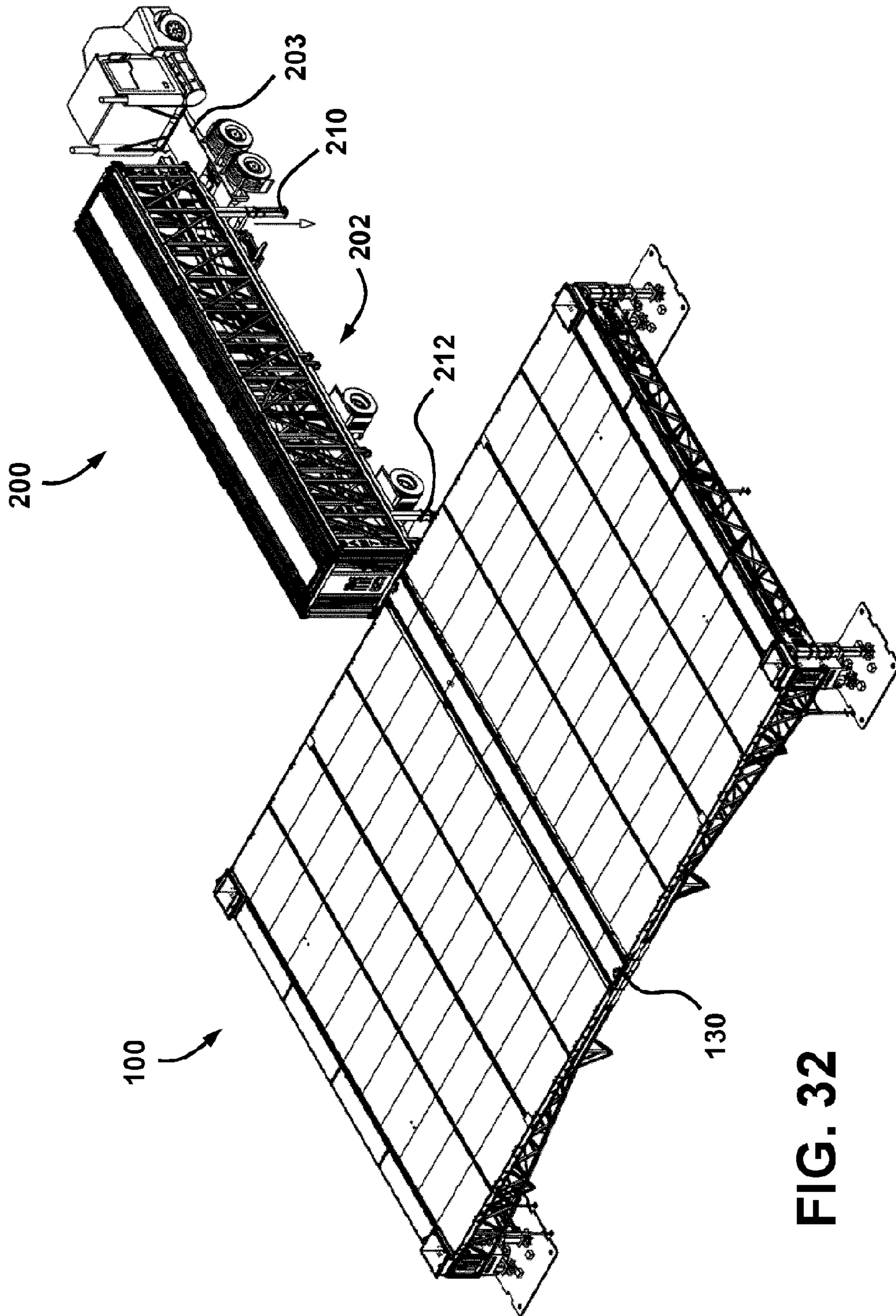


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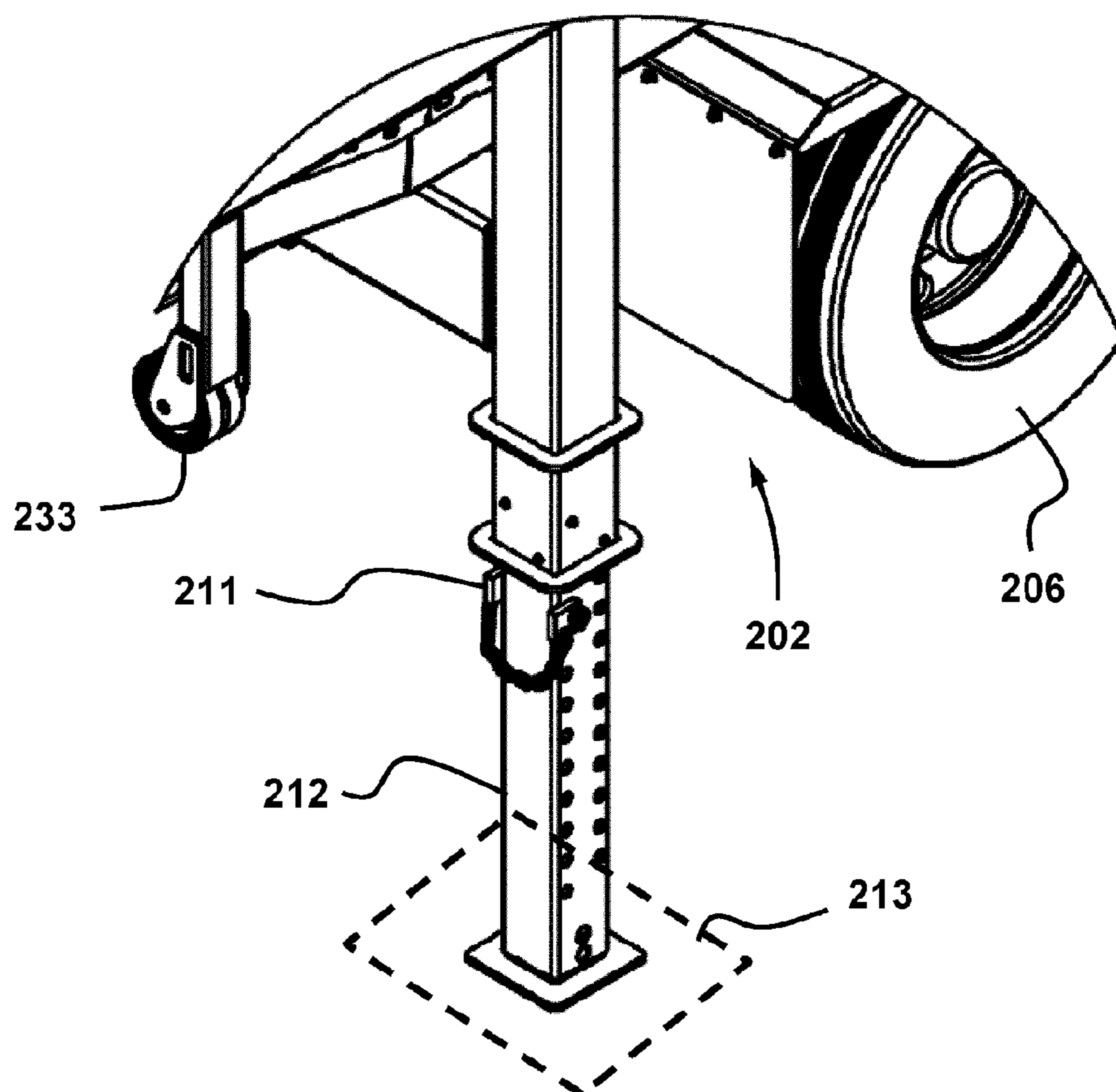


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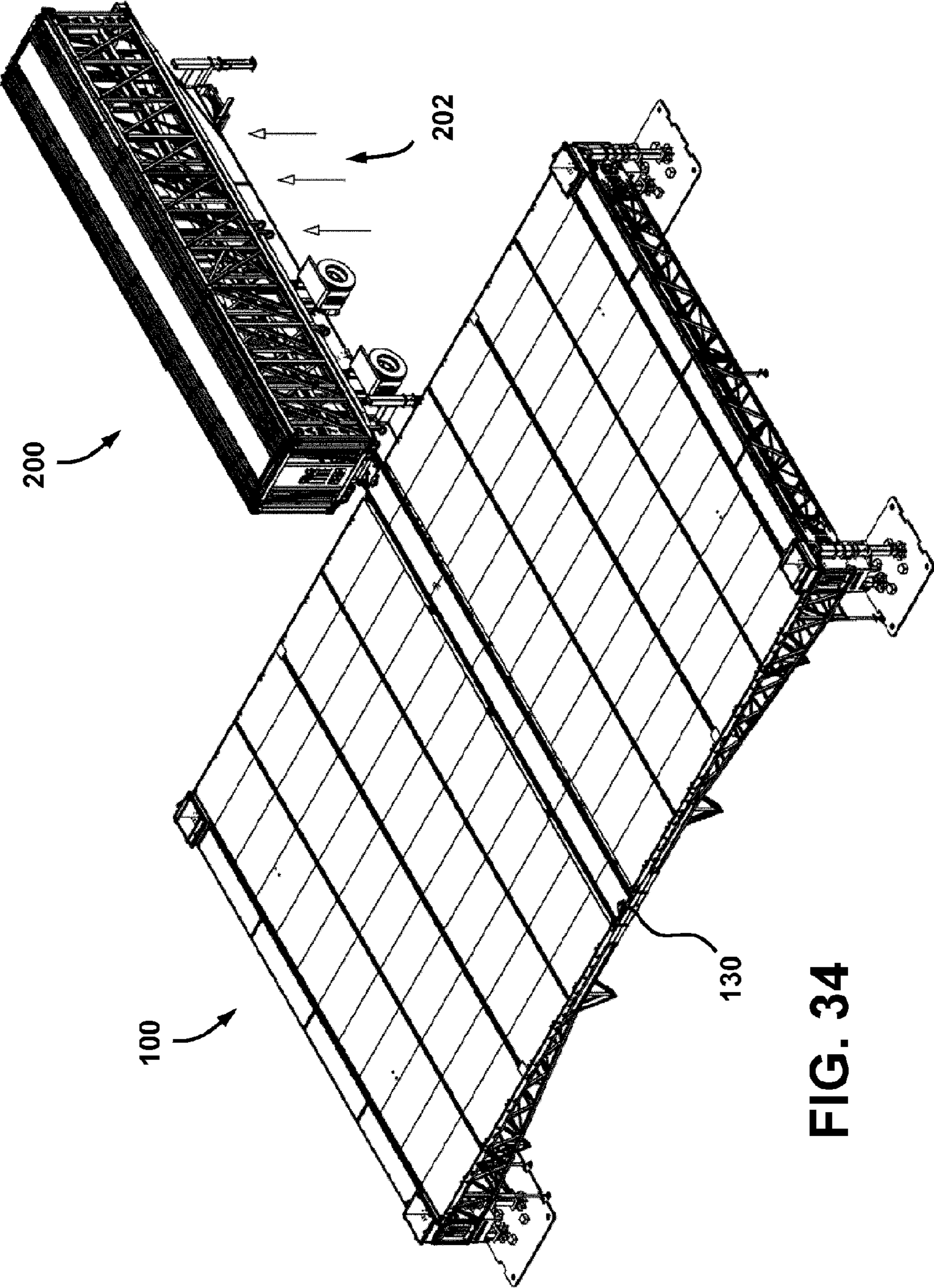


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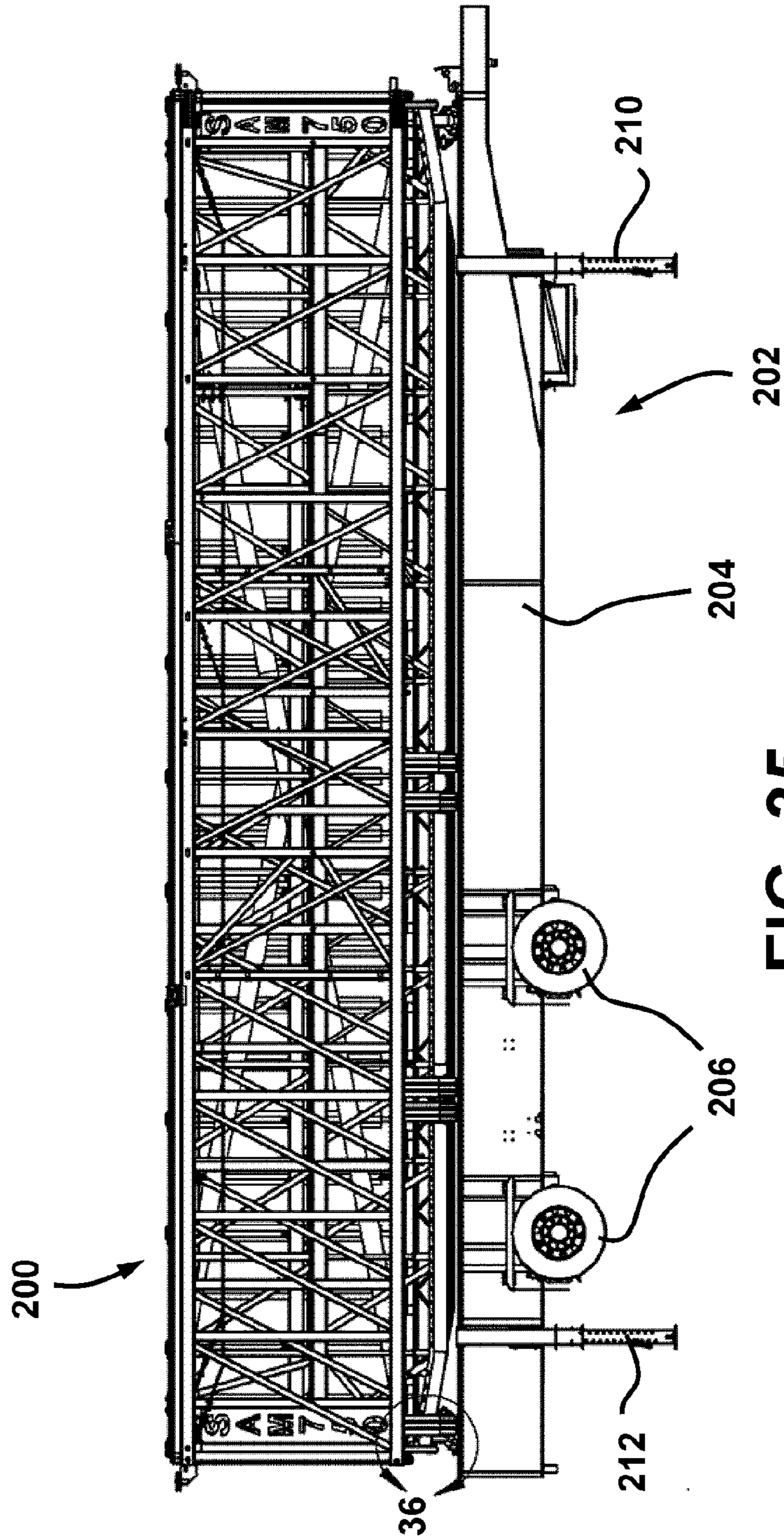


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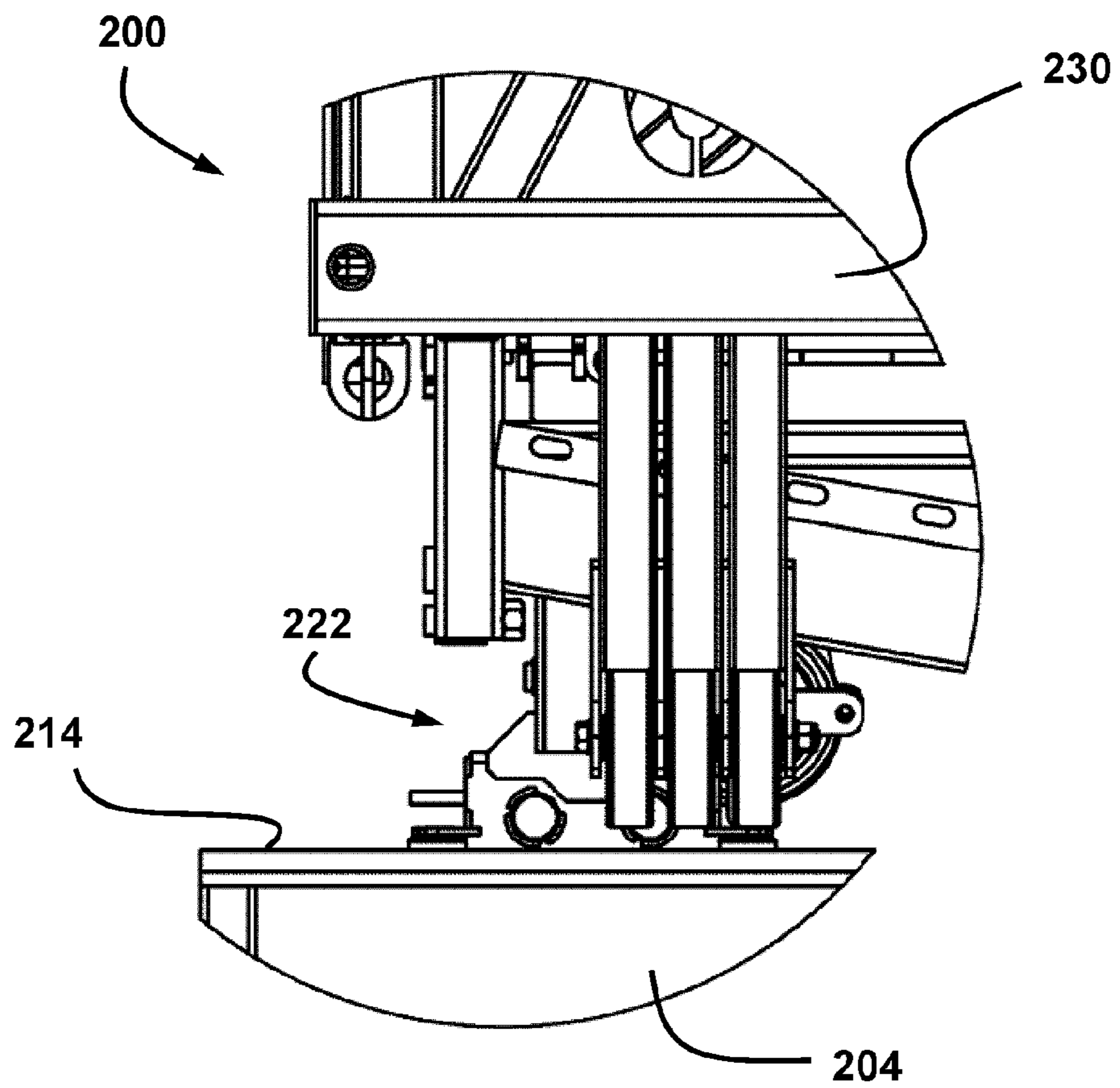


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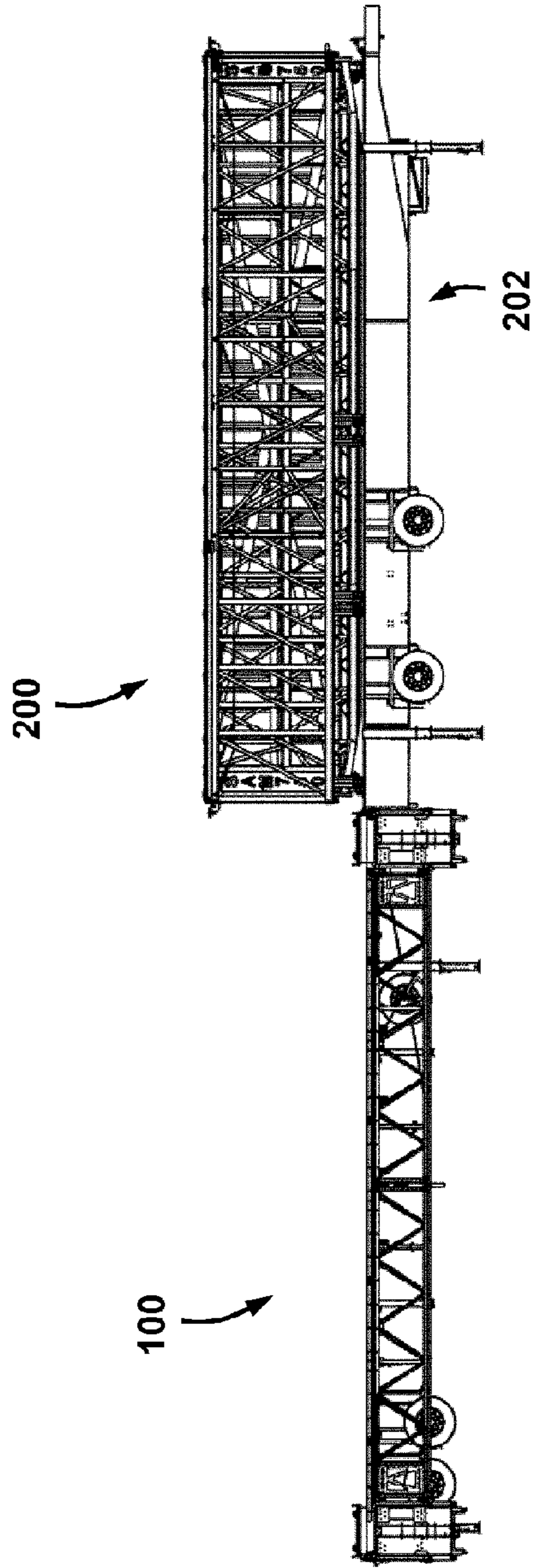


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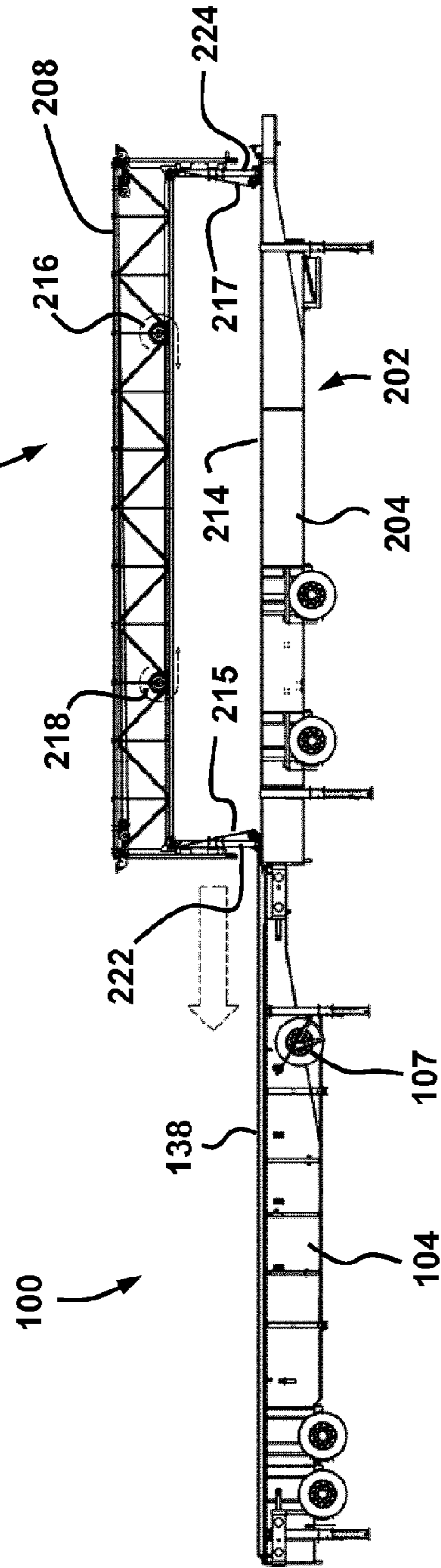


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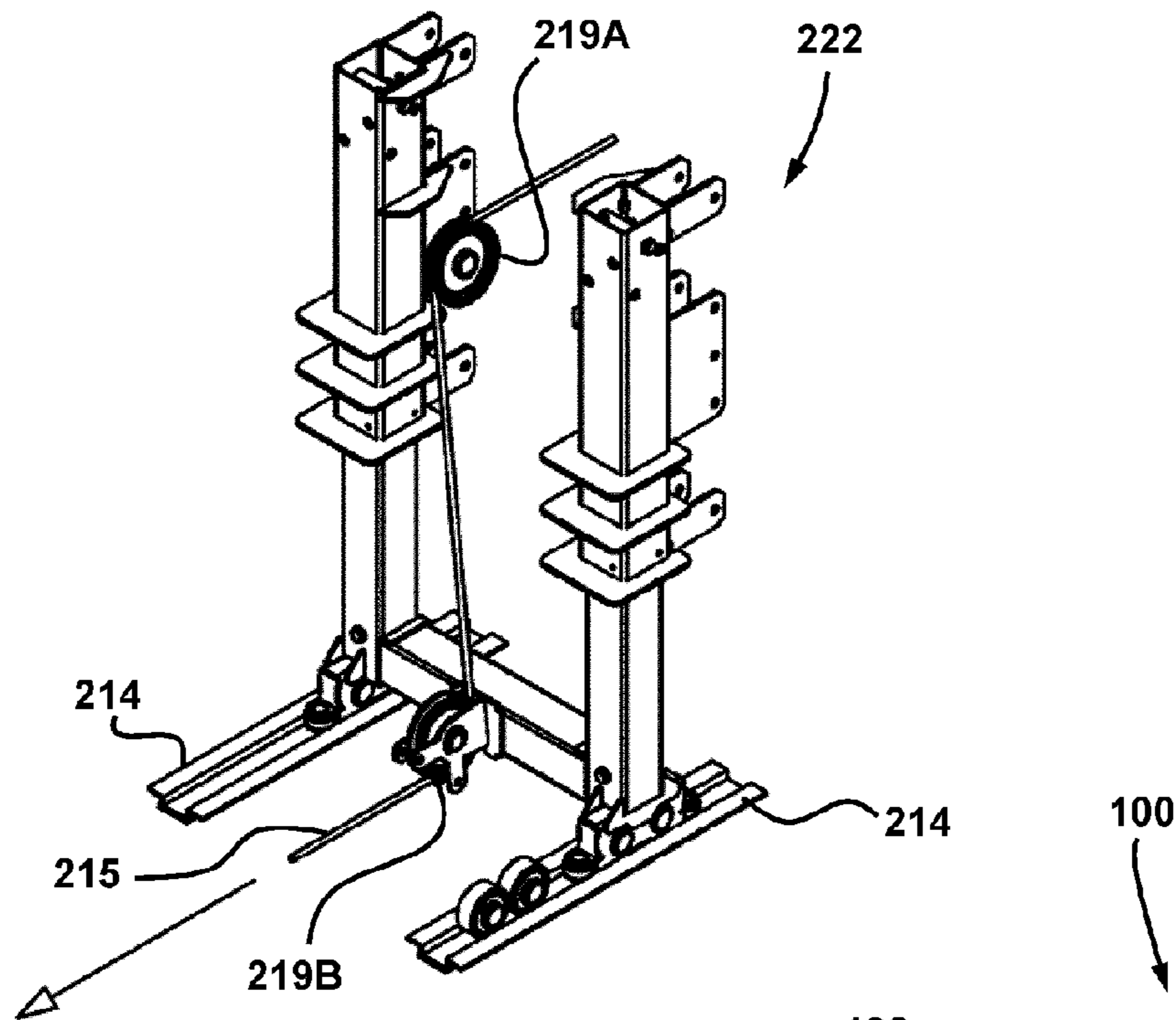


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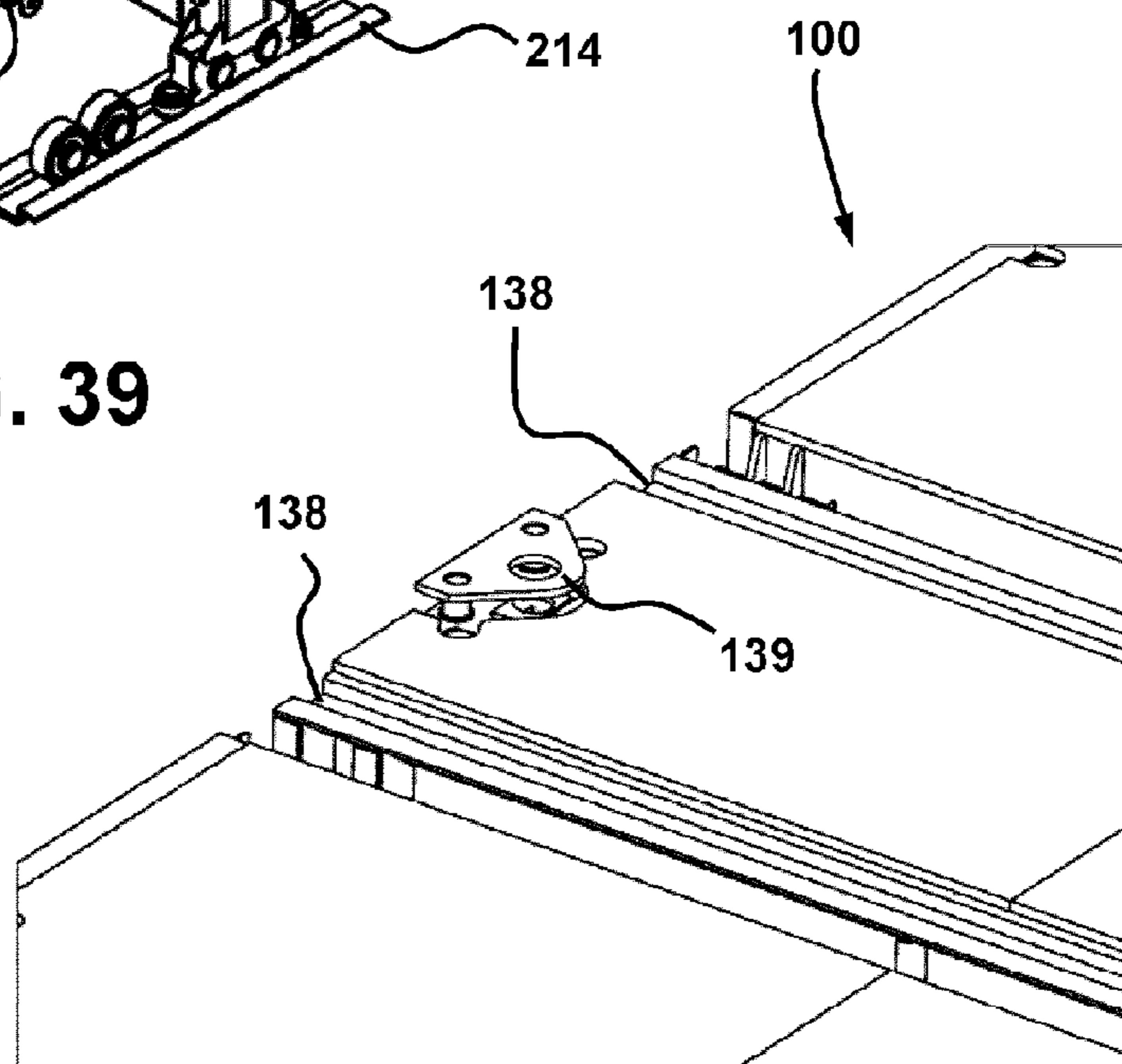


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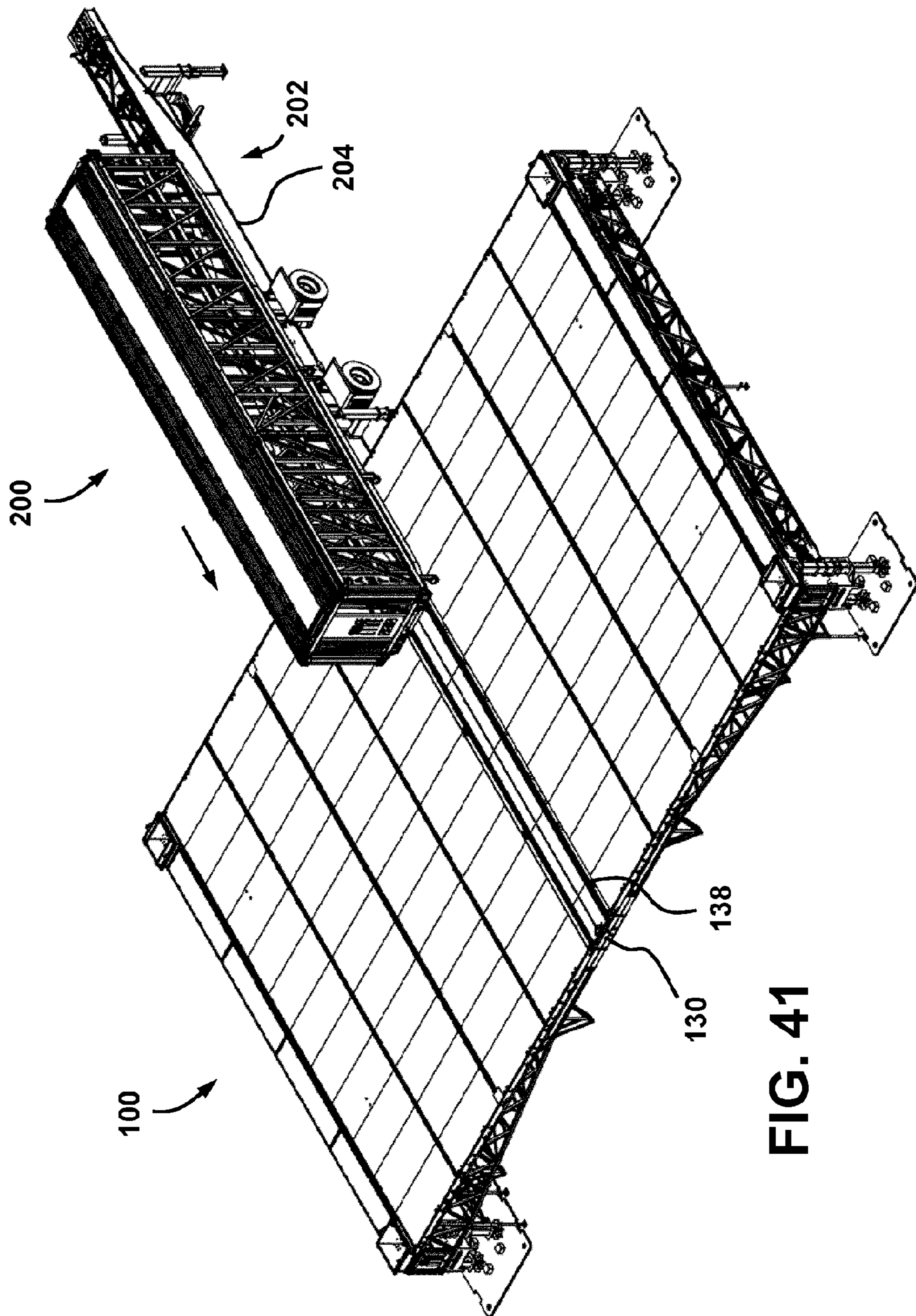


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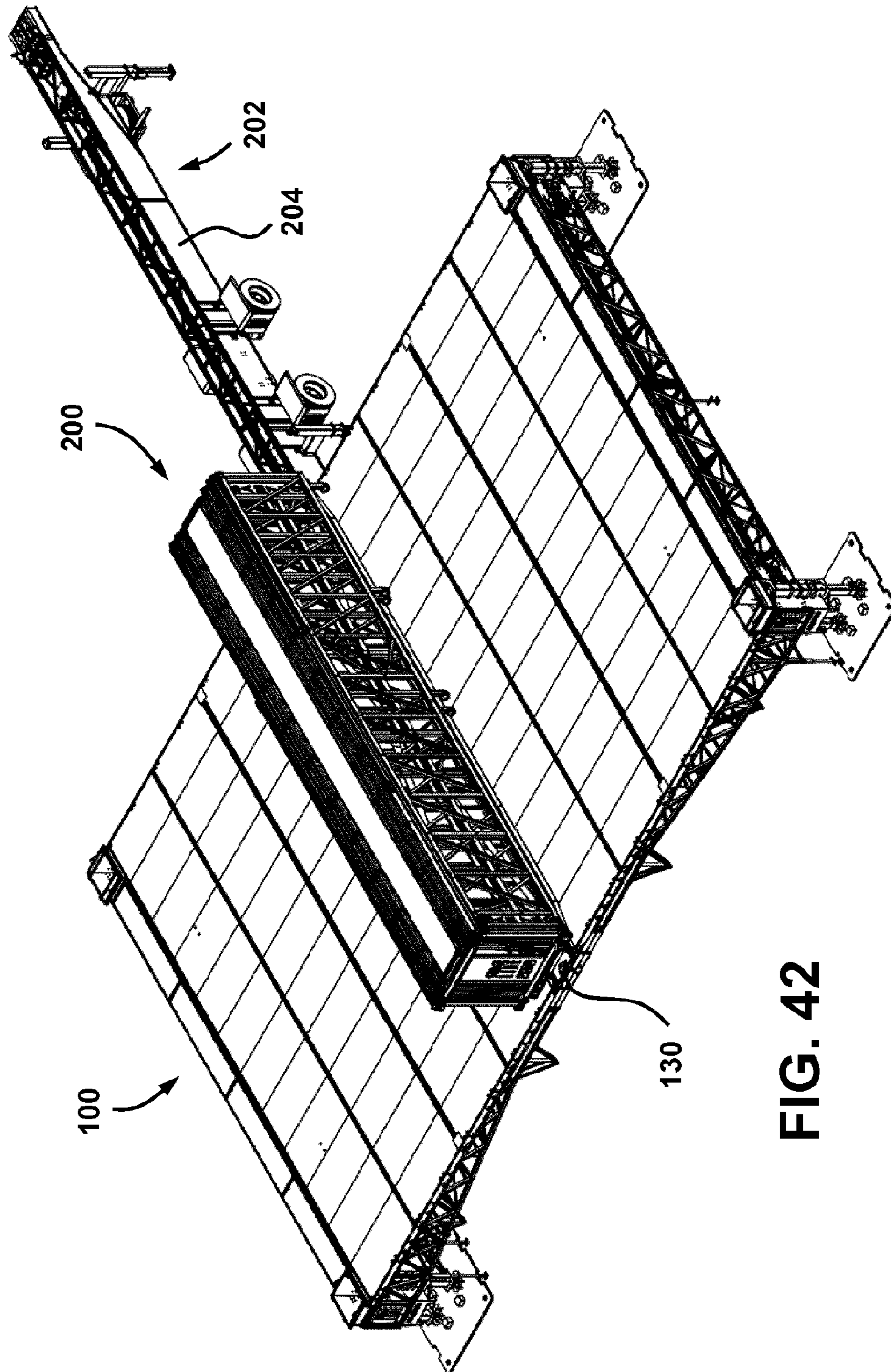


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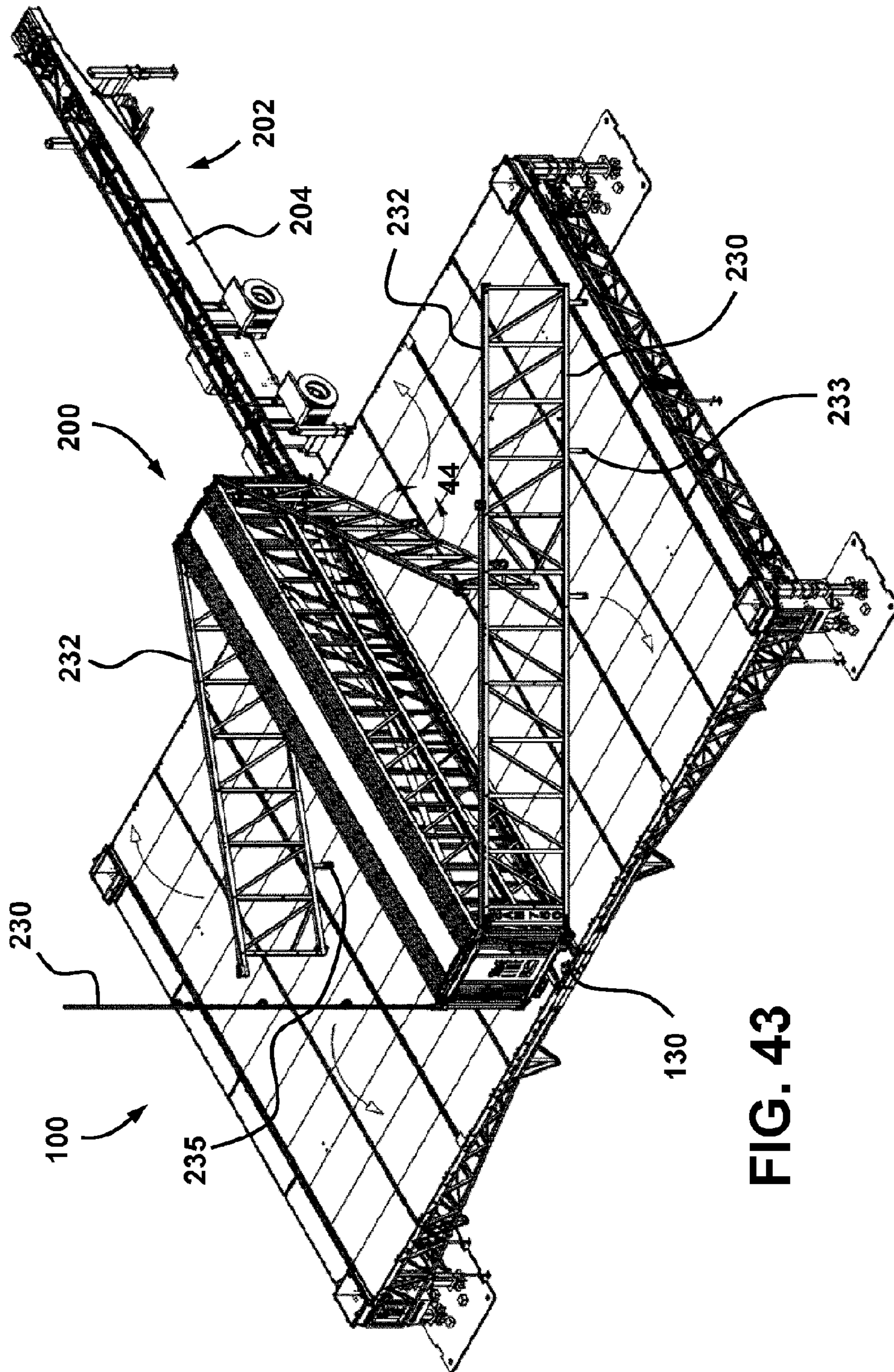


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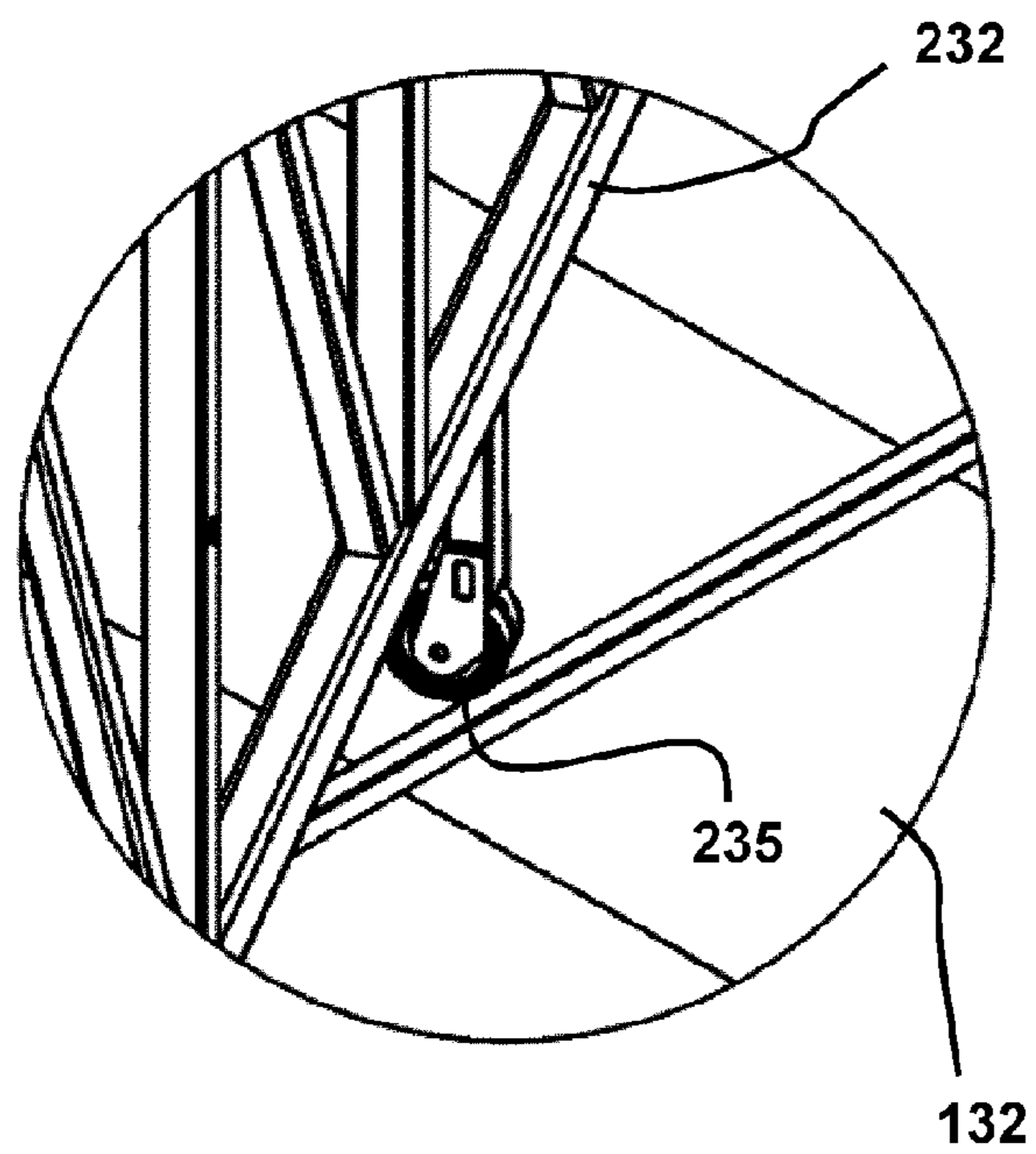


FIG. 44

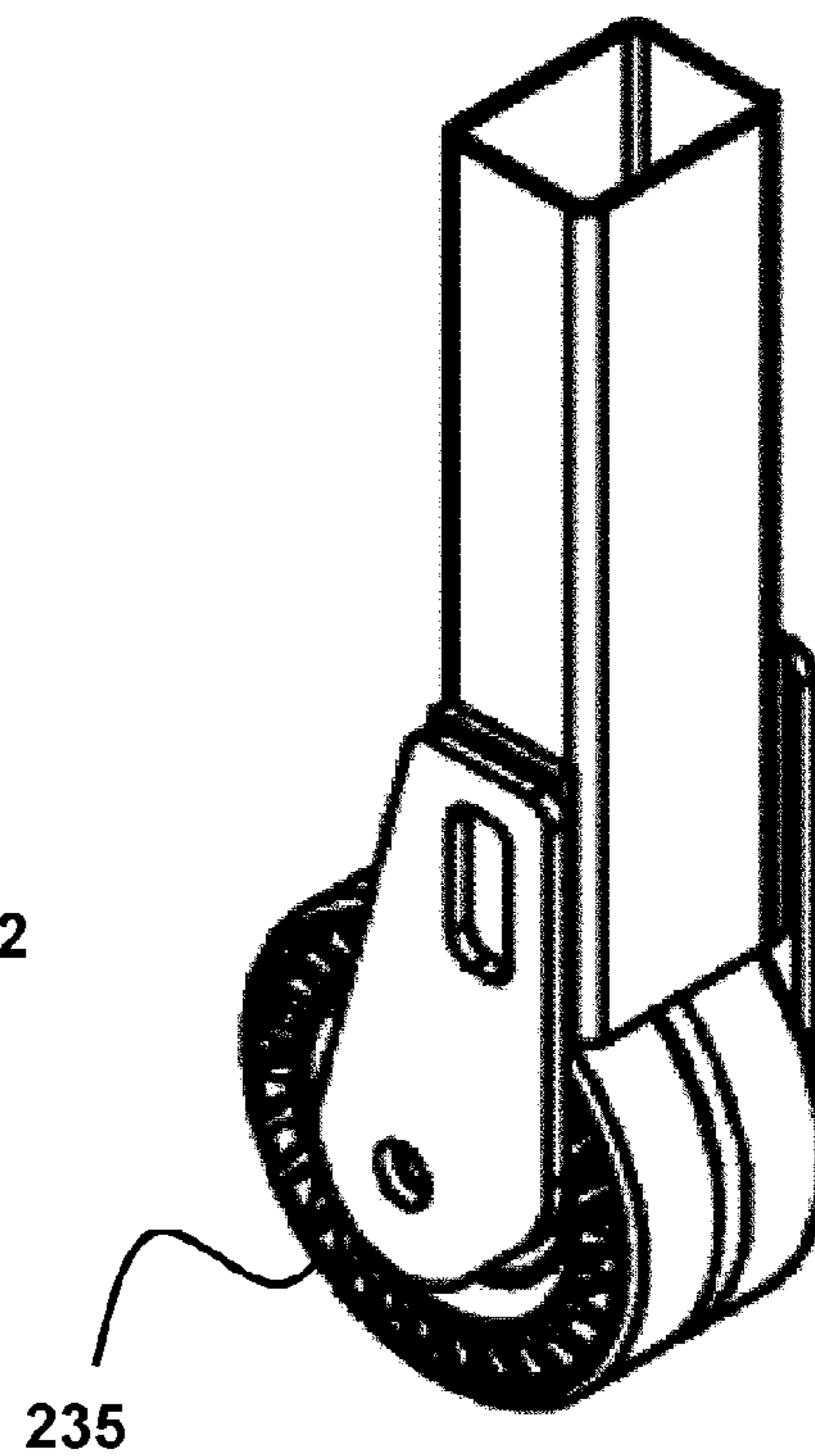


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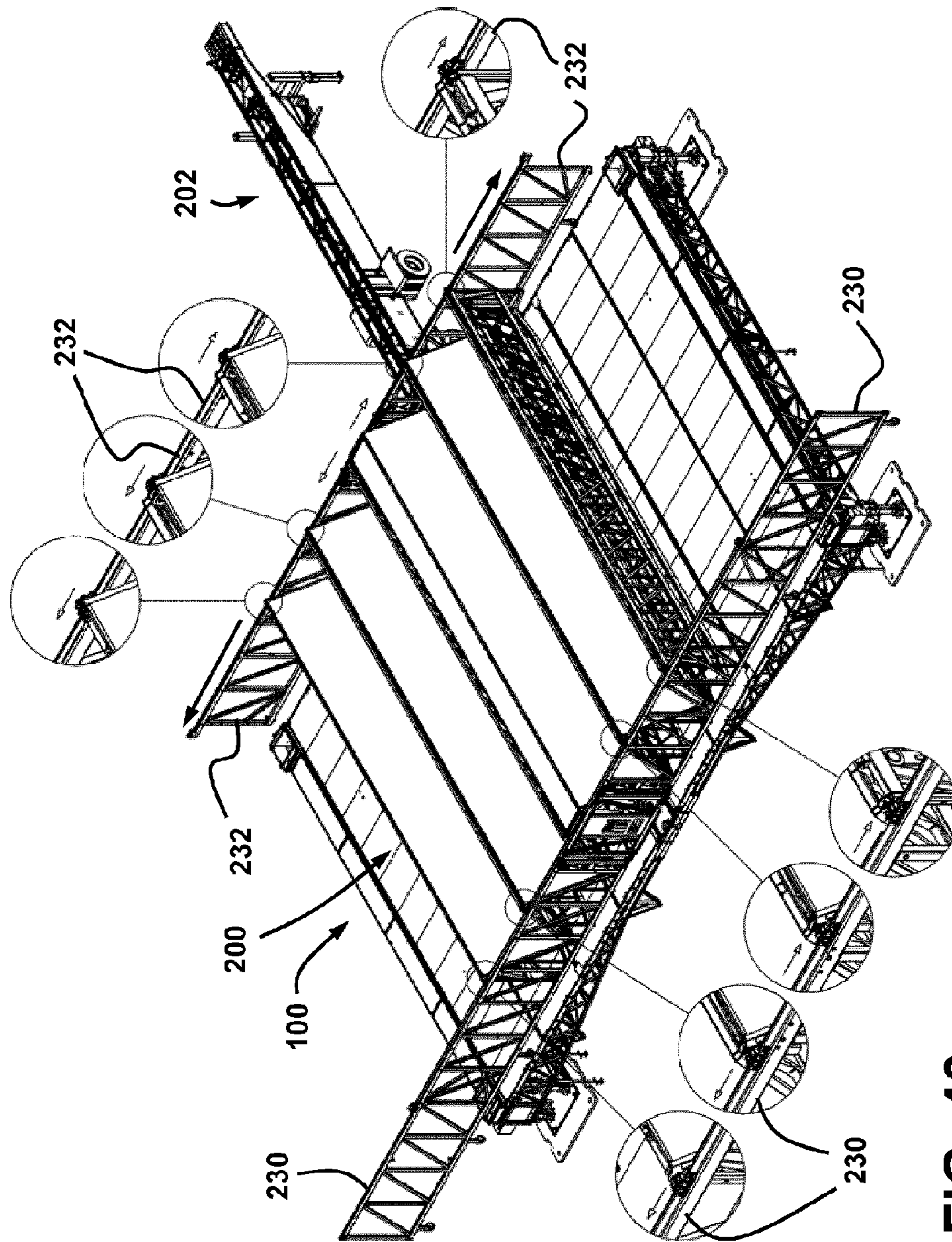


FIG. 46

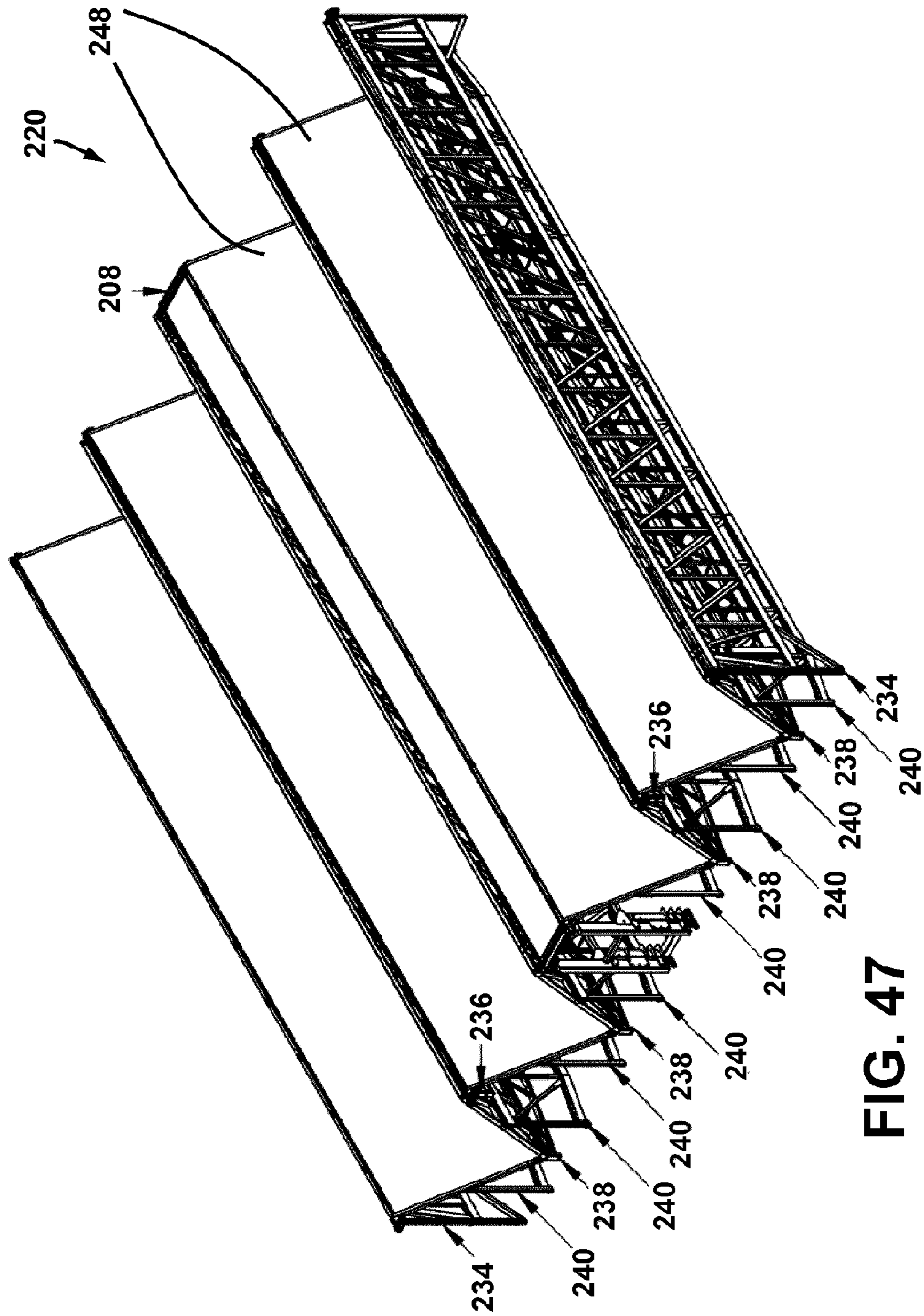


FIG. 47

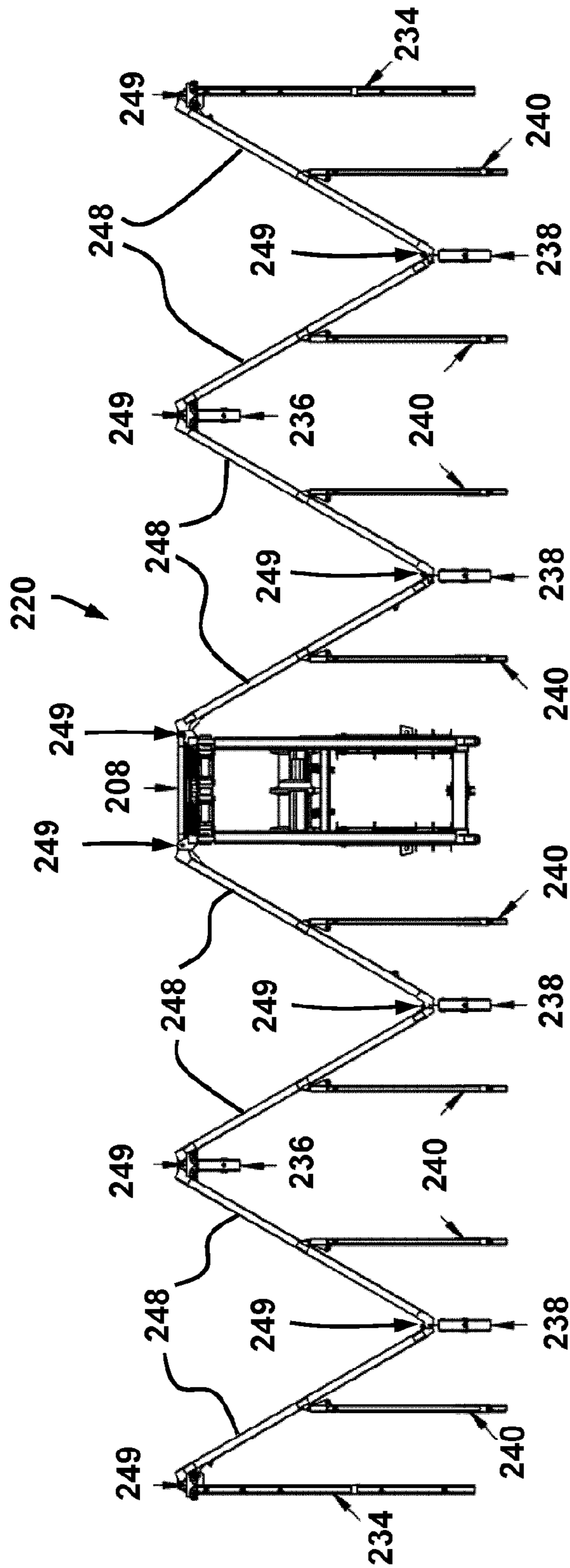


FIG. 48

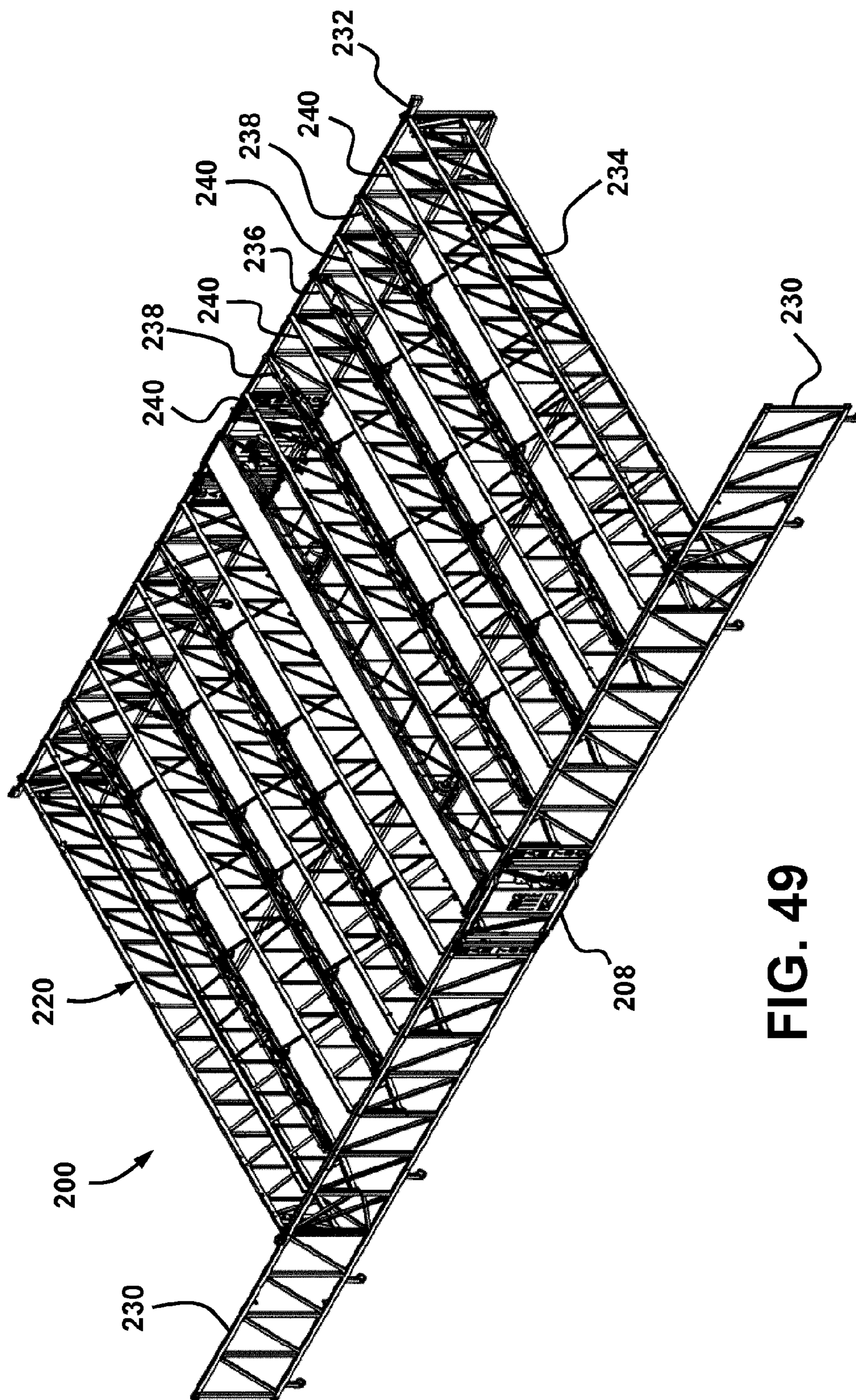


FIG. 49

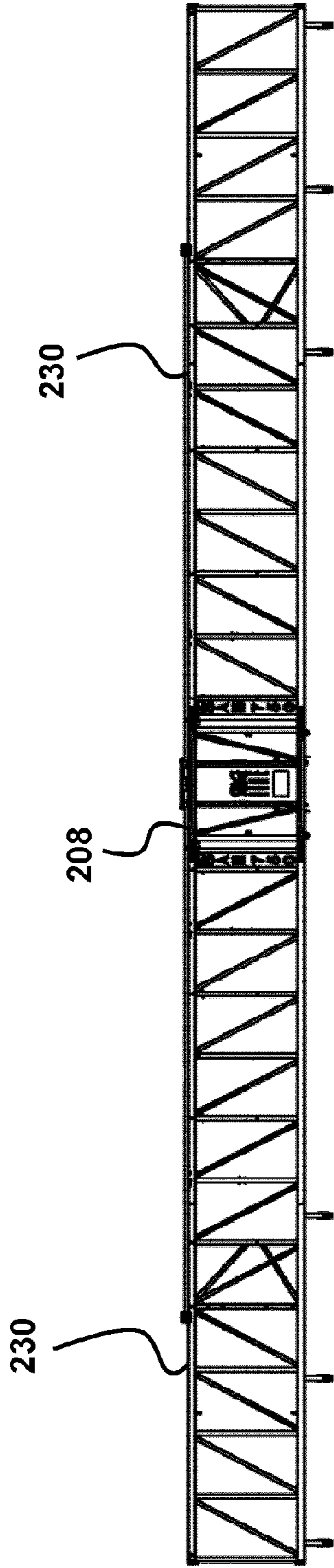


FIG. 50

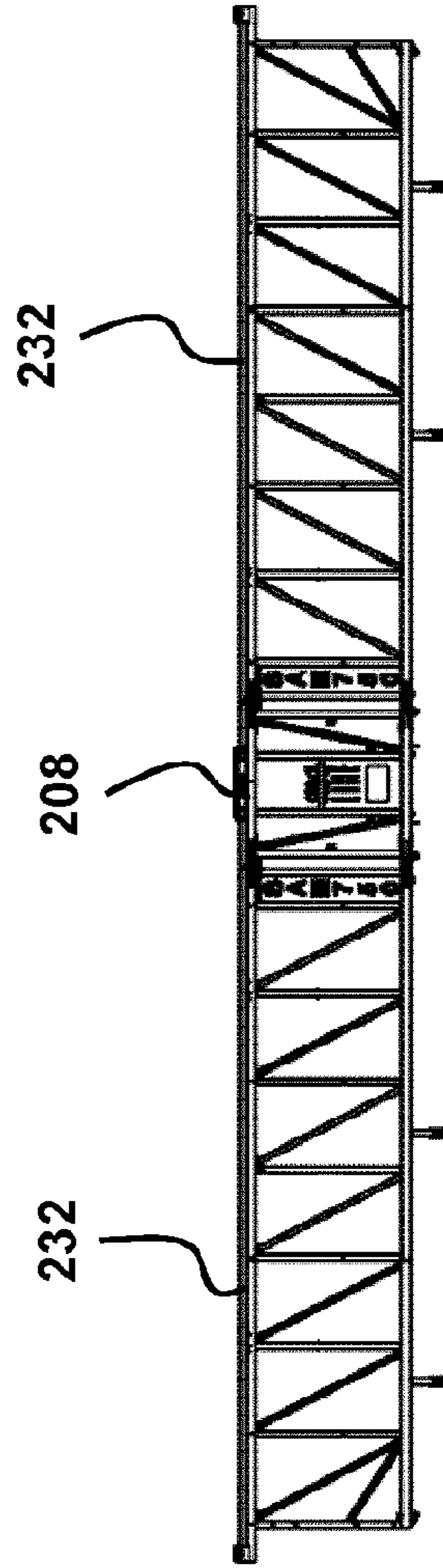


FIG. 51

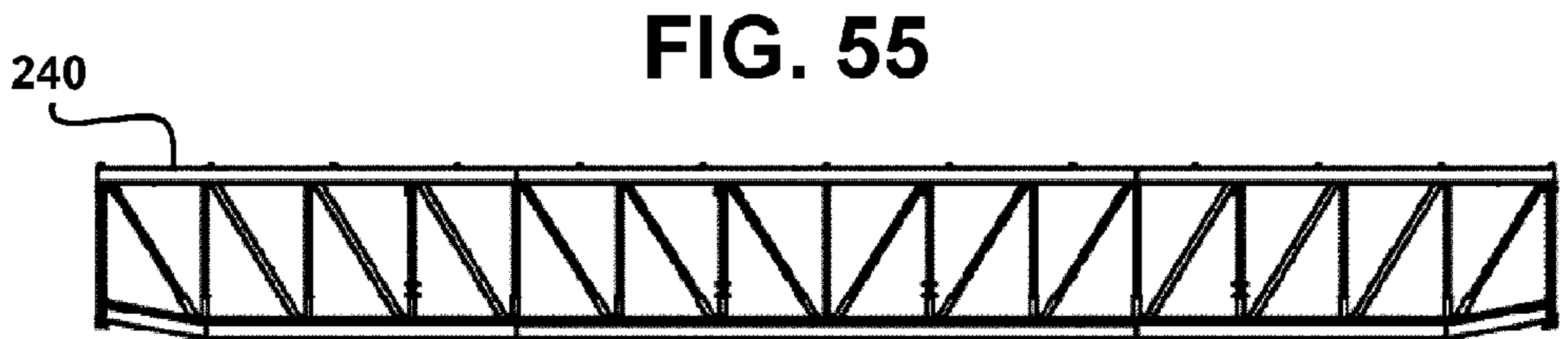
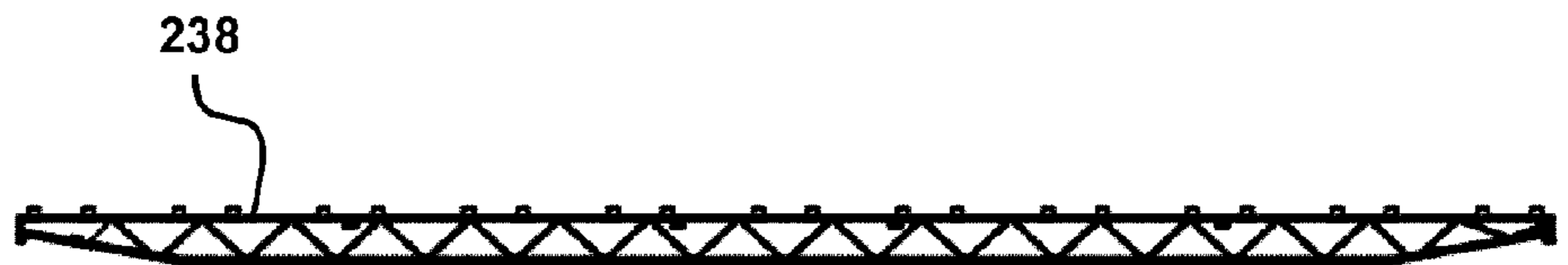
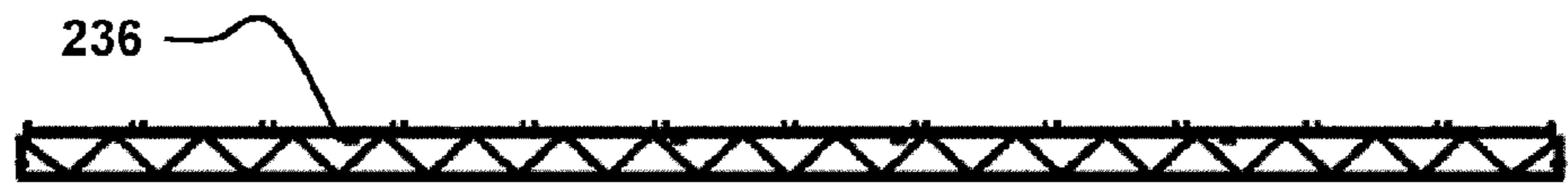
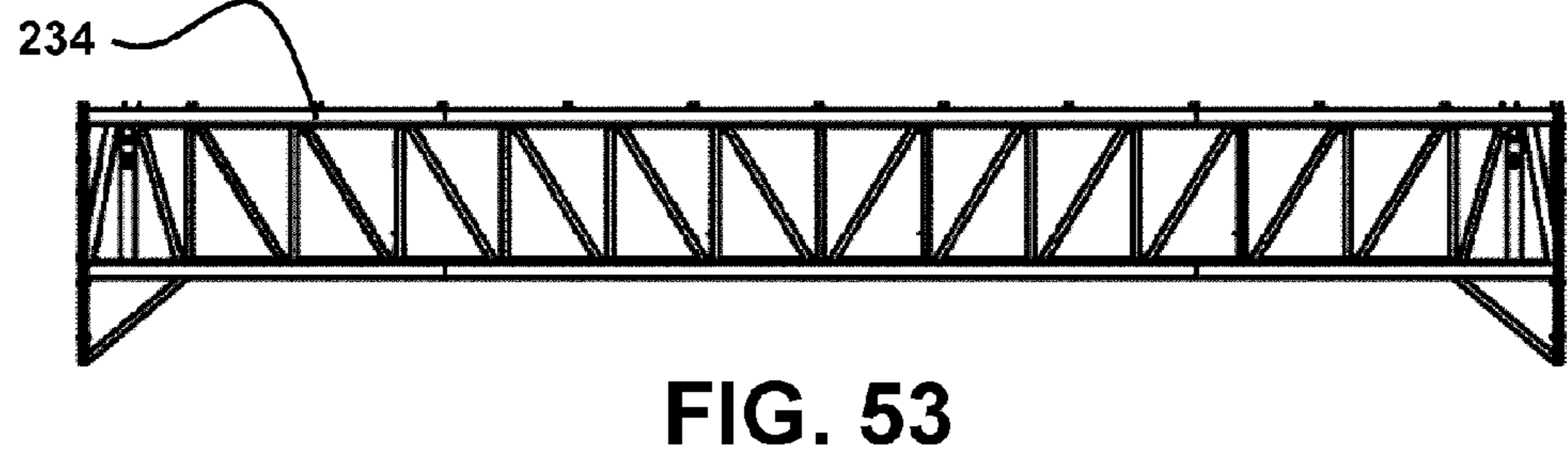
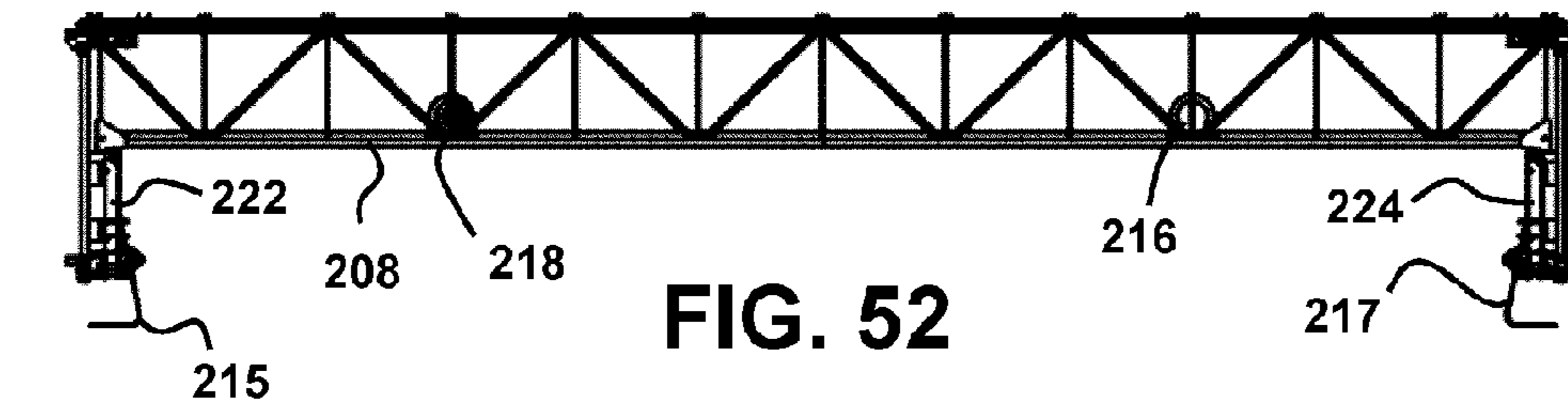


FIG. 56

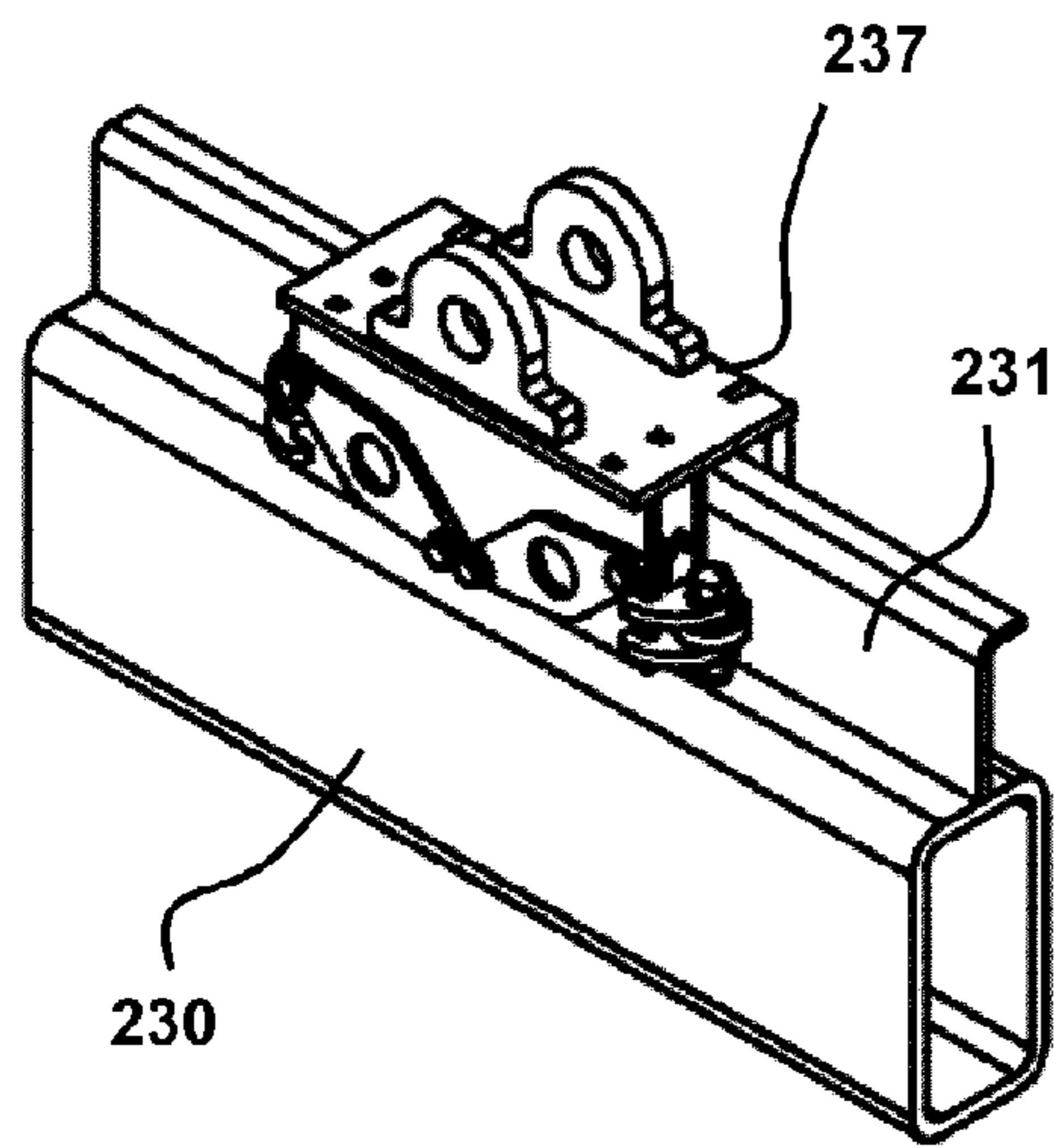


FIG. 57

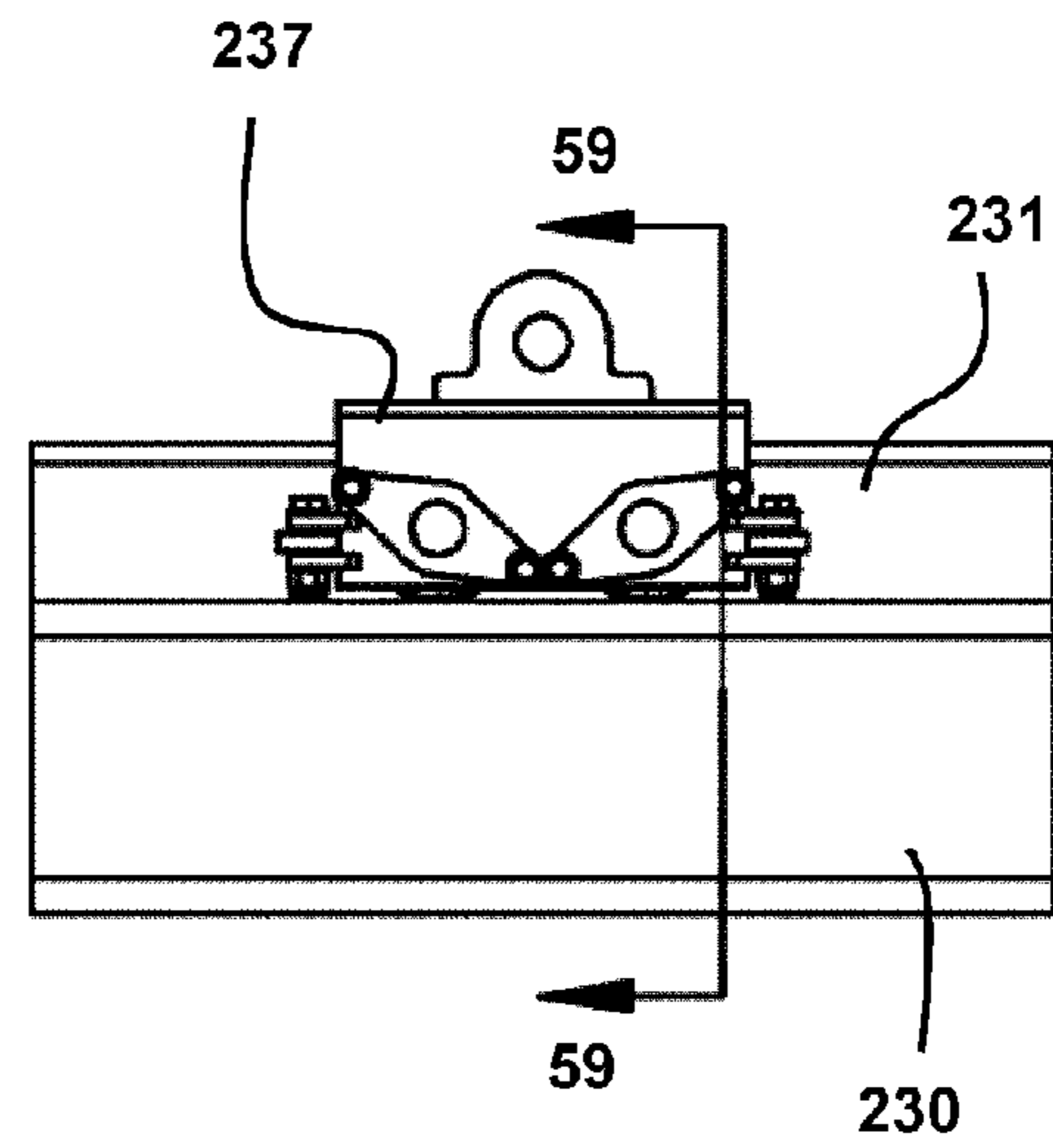


FIG. 58

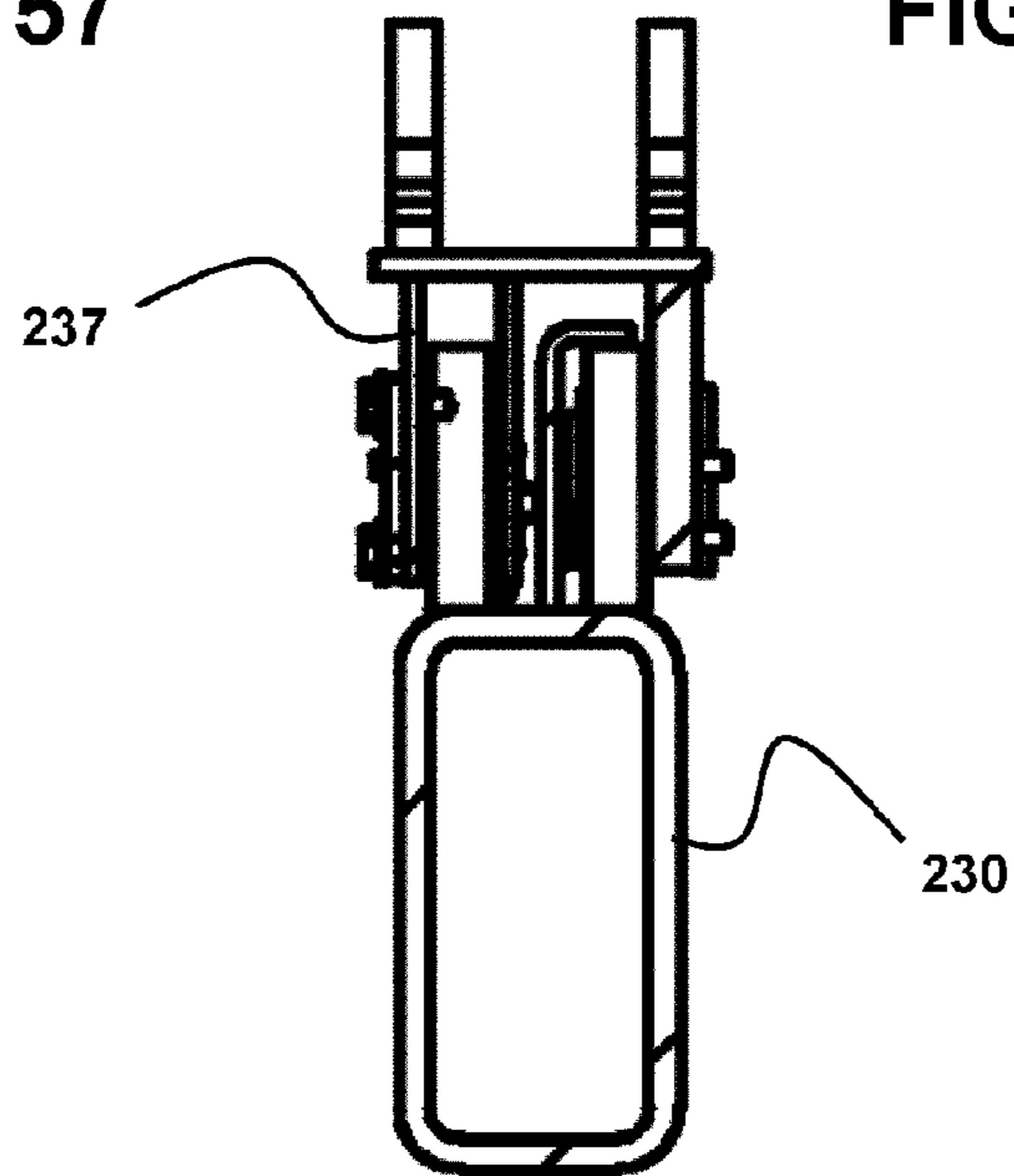


FIG. 59

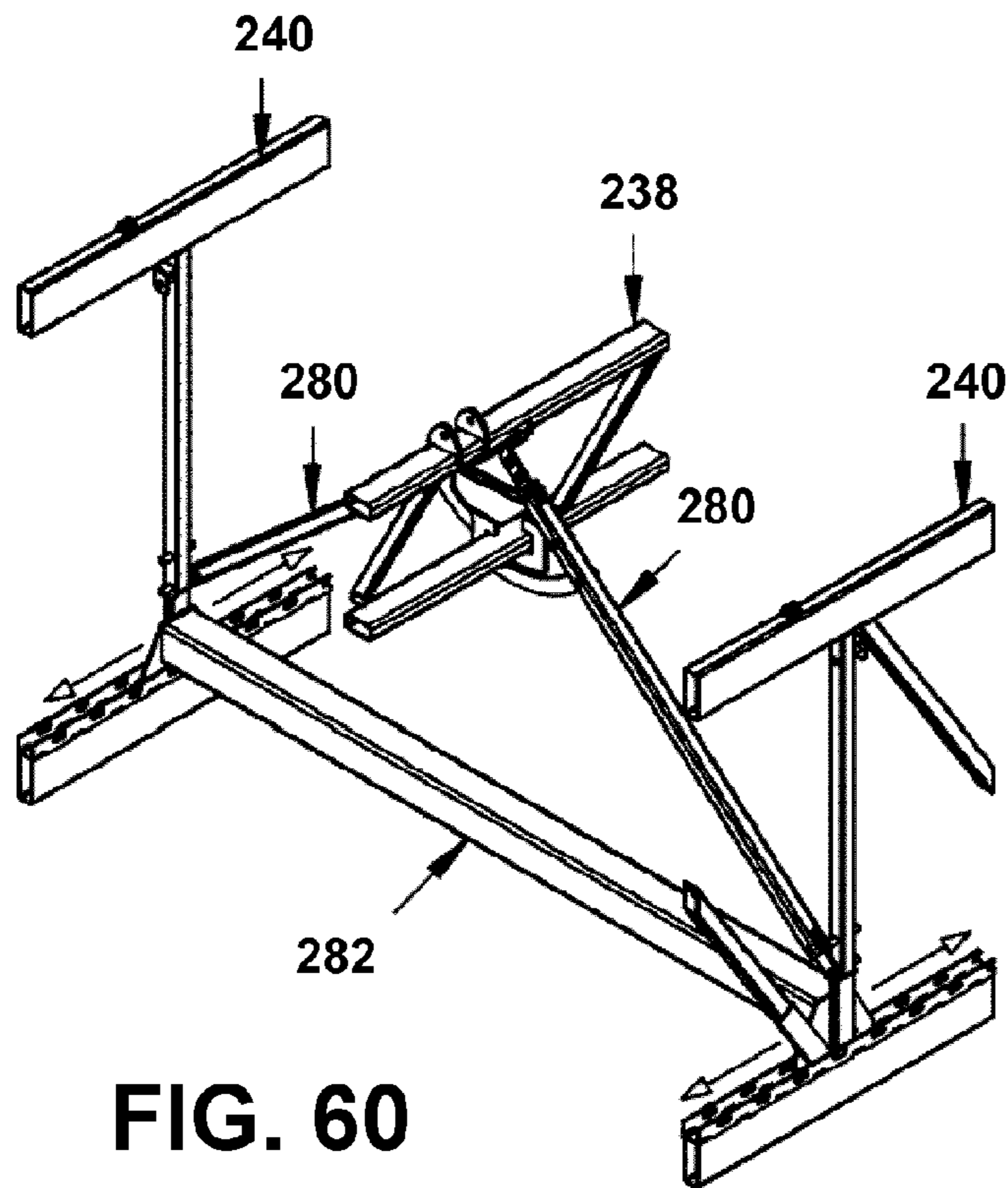


FIG. 60

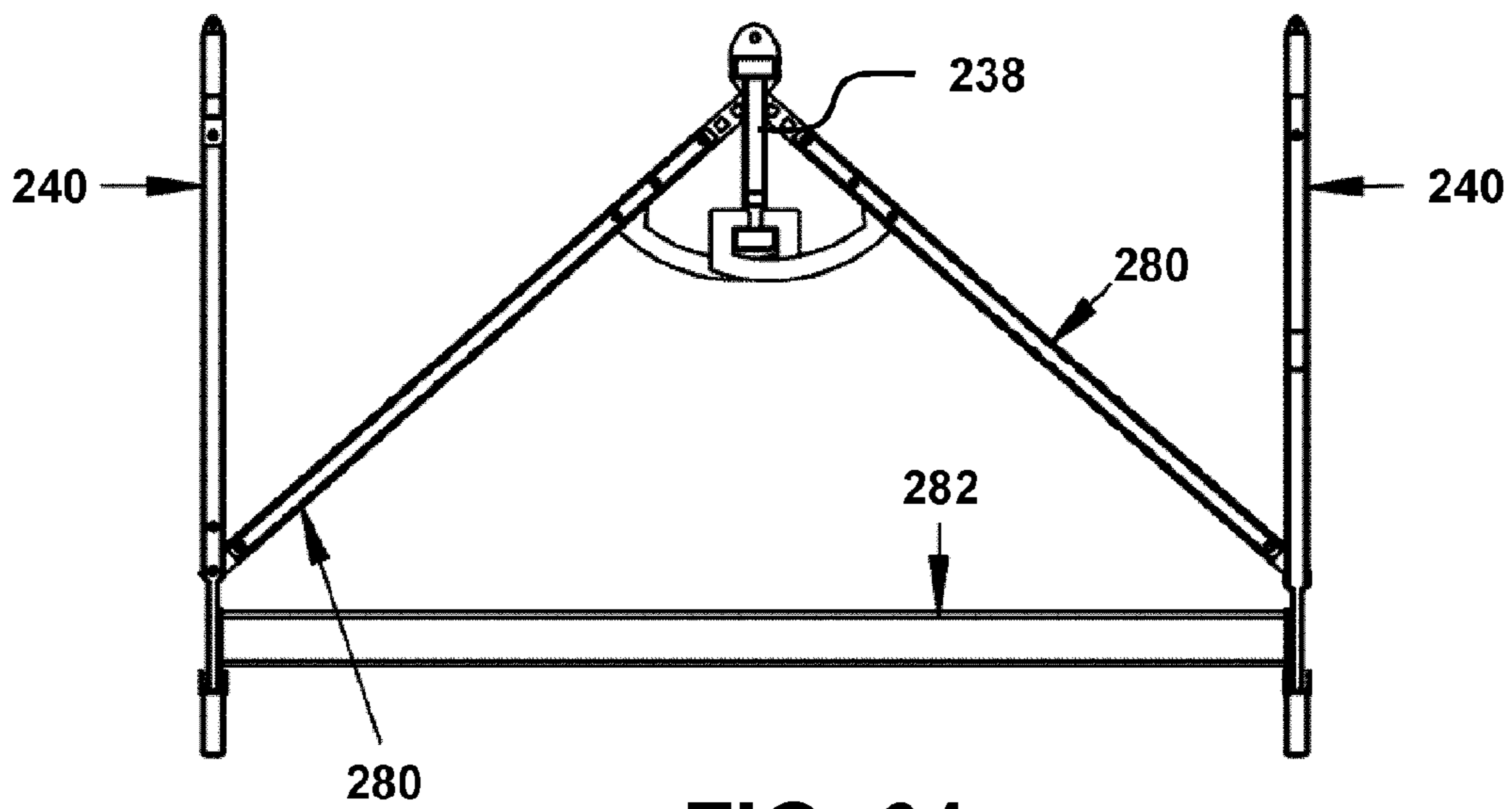


FIG. 61

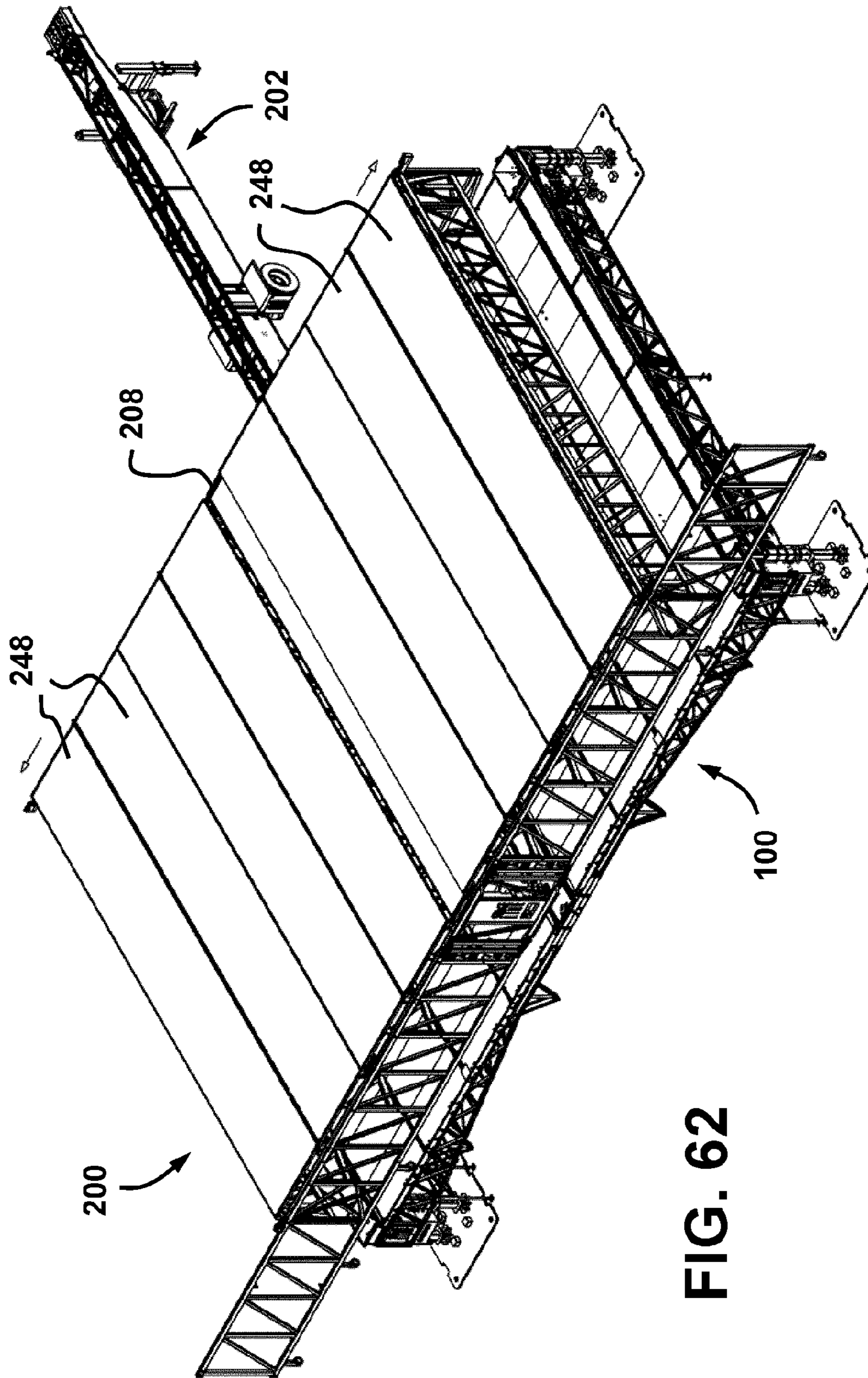


FIG. 62

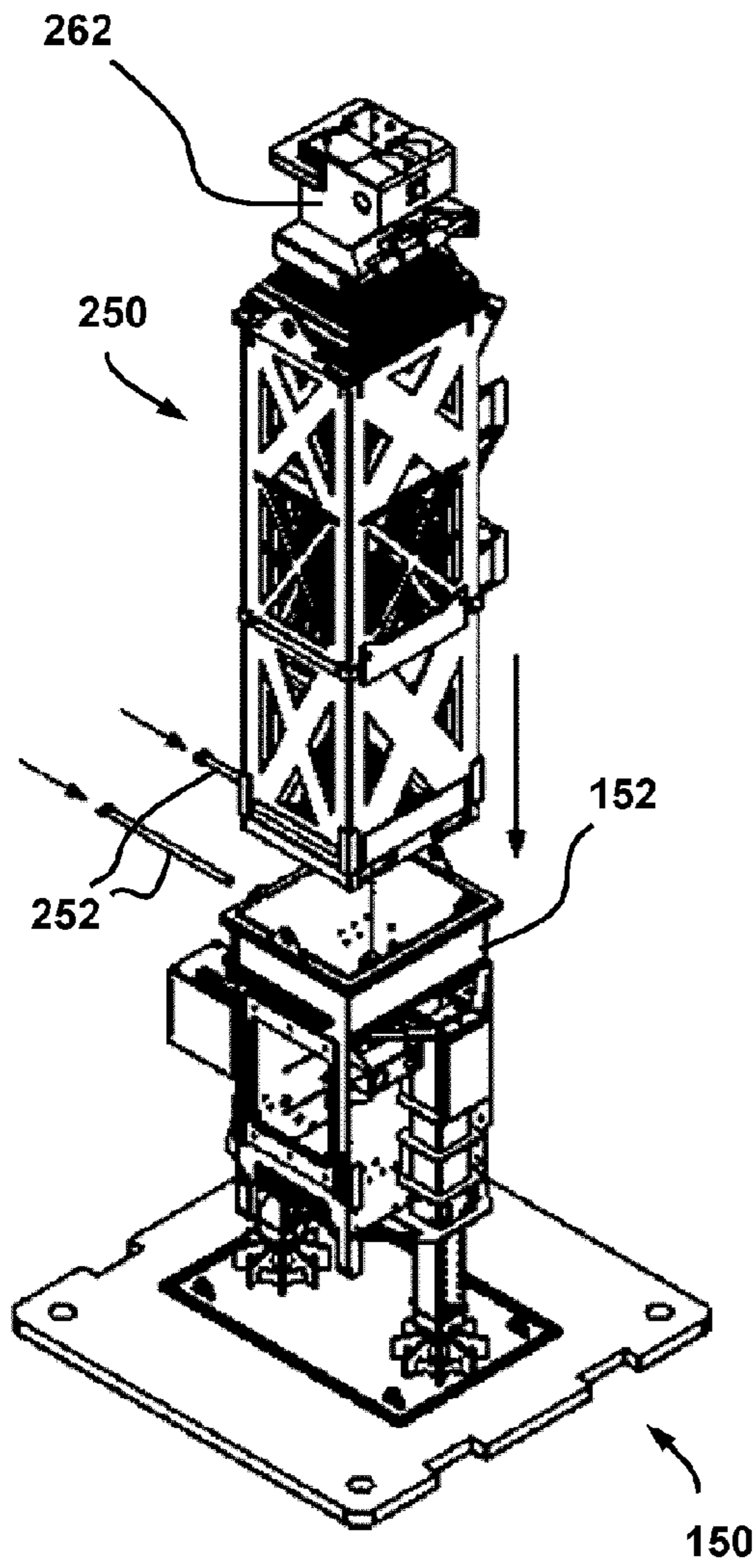


FIG. 63

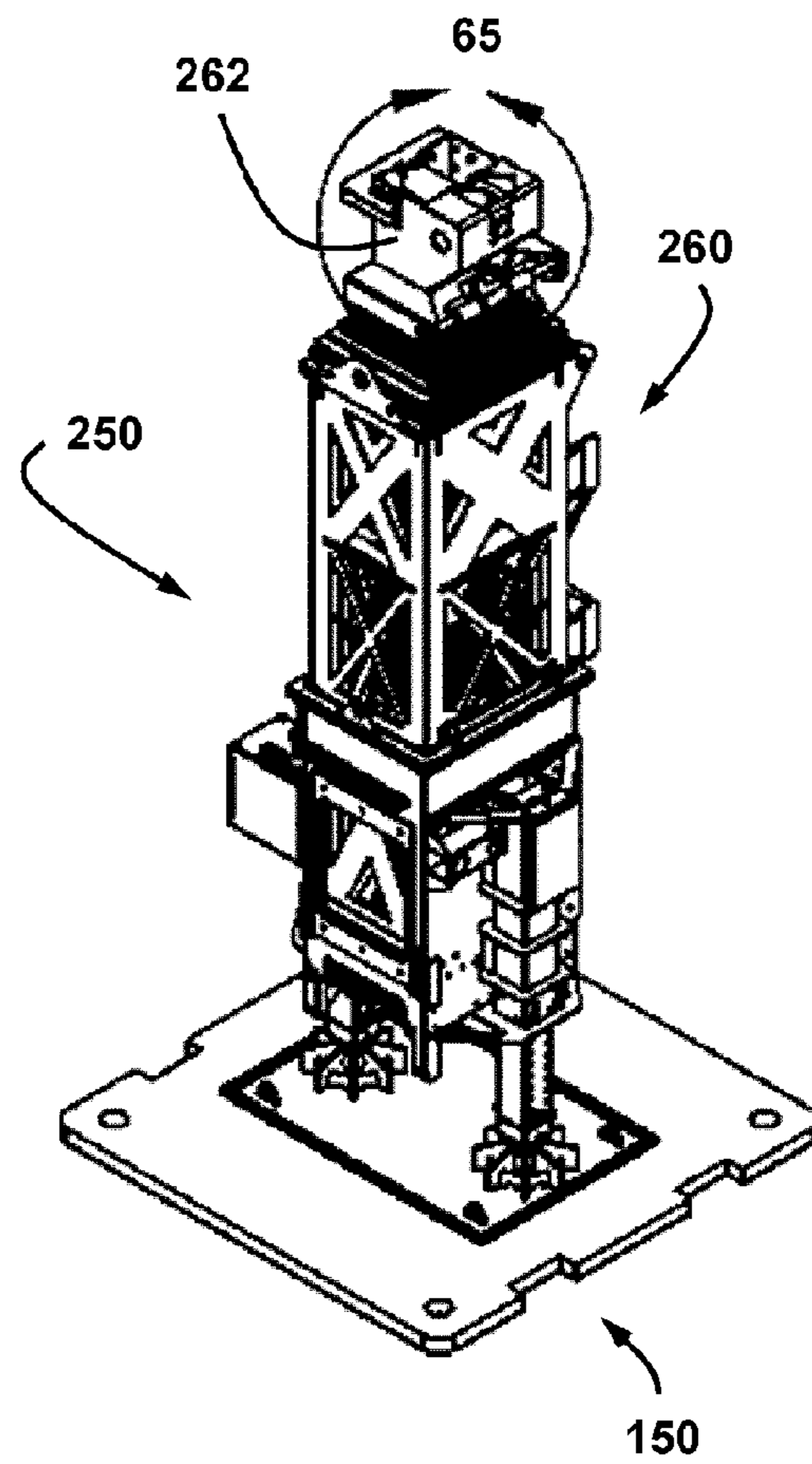


FIG. 64

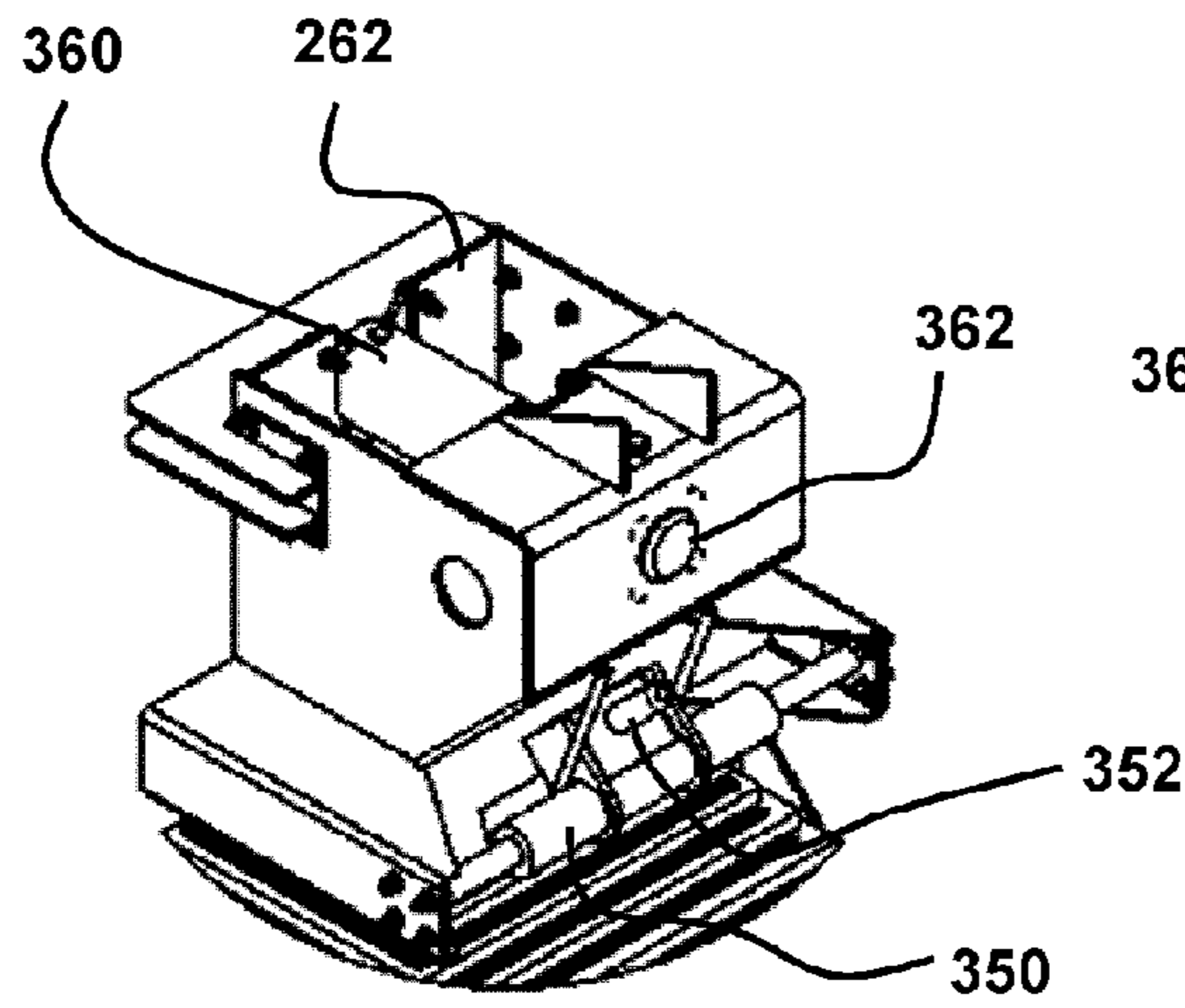


FIG. 65

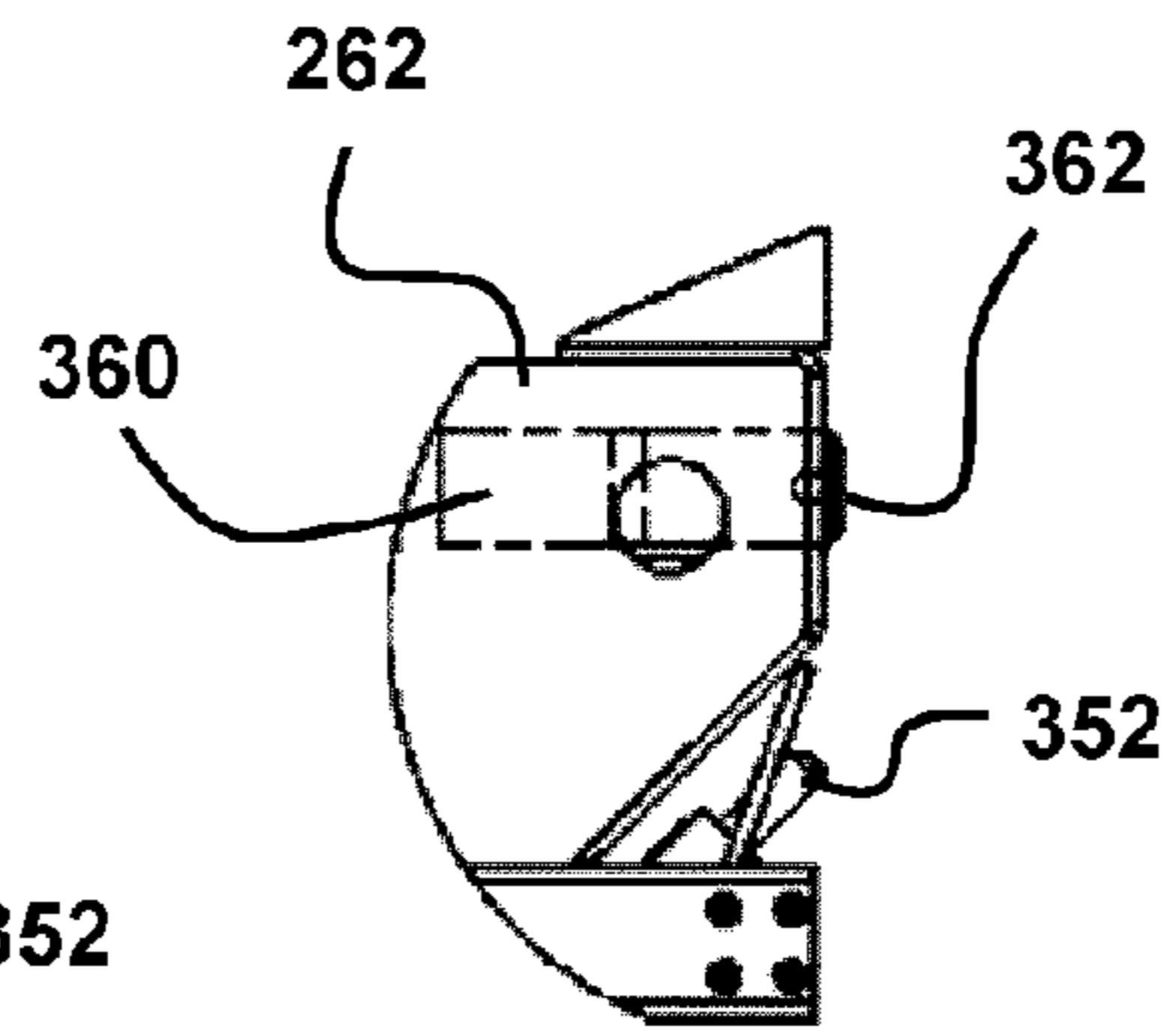


FIG. 66

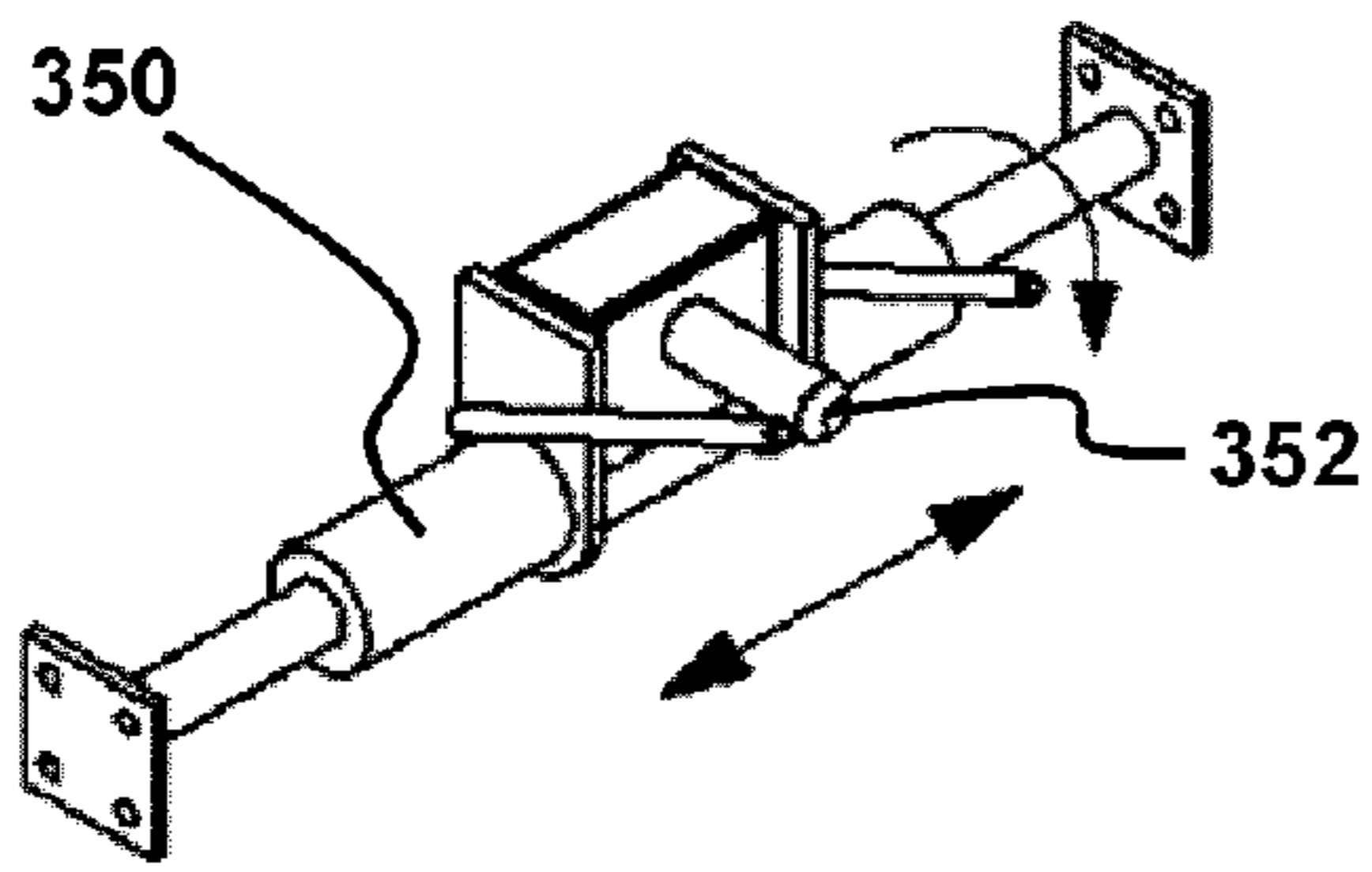


FIG. 67

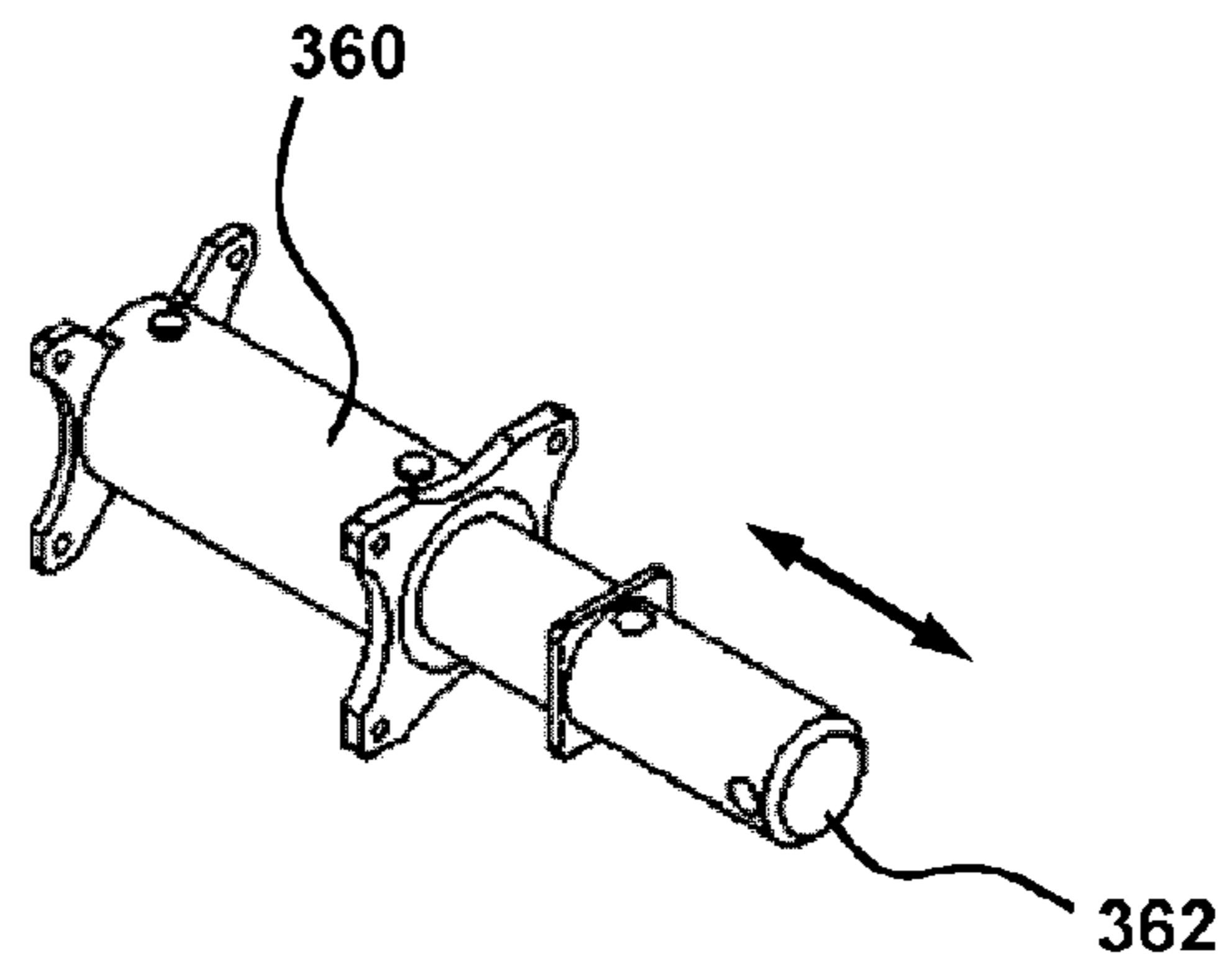


FIG. 68

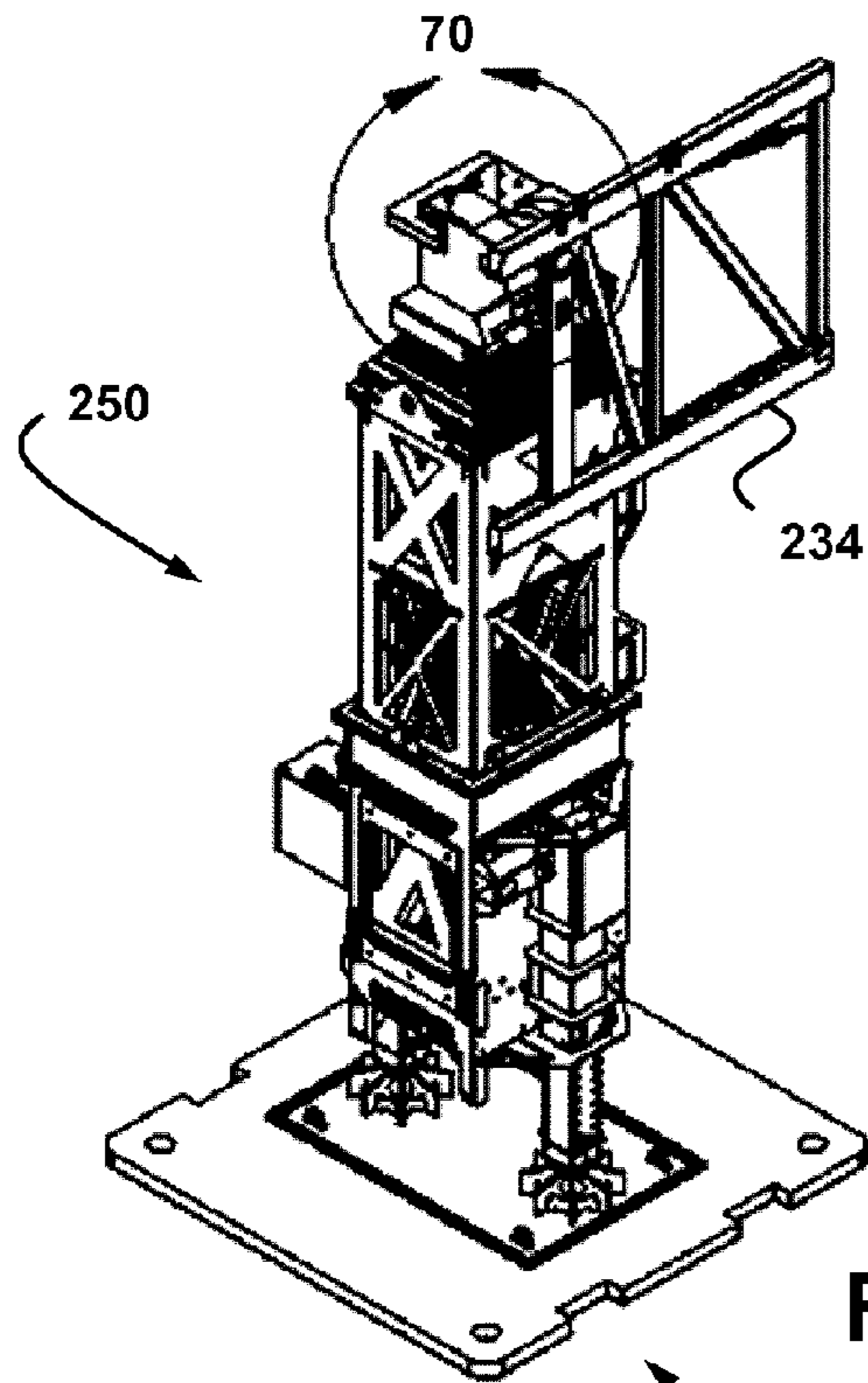


FIG. 69

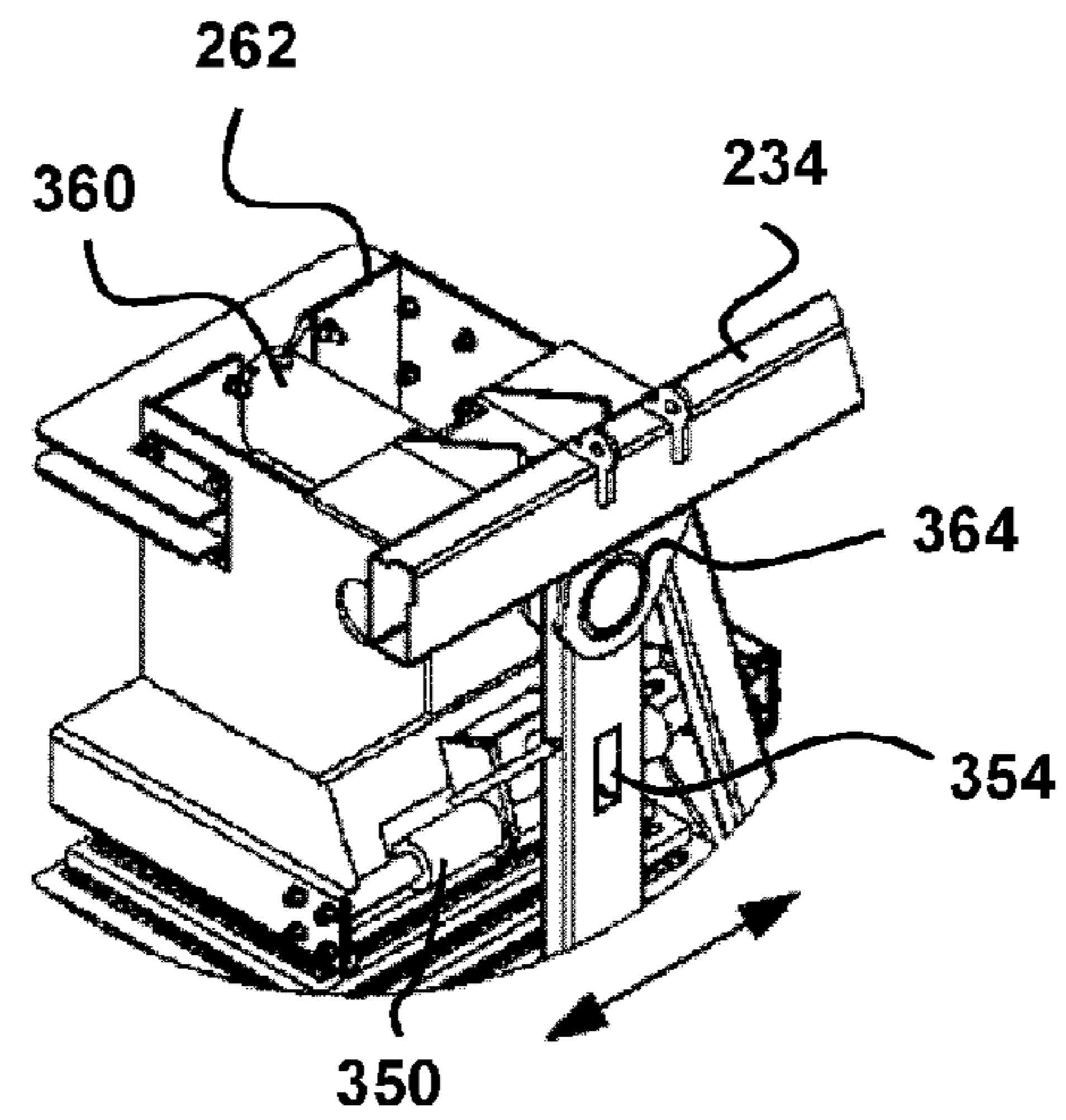


FIG. 70

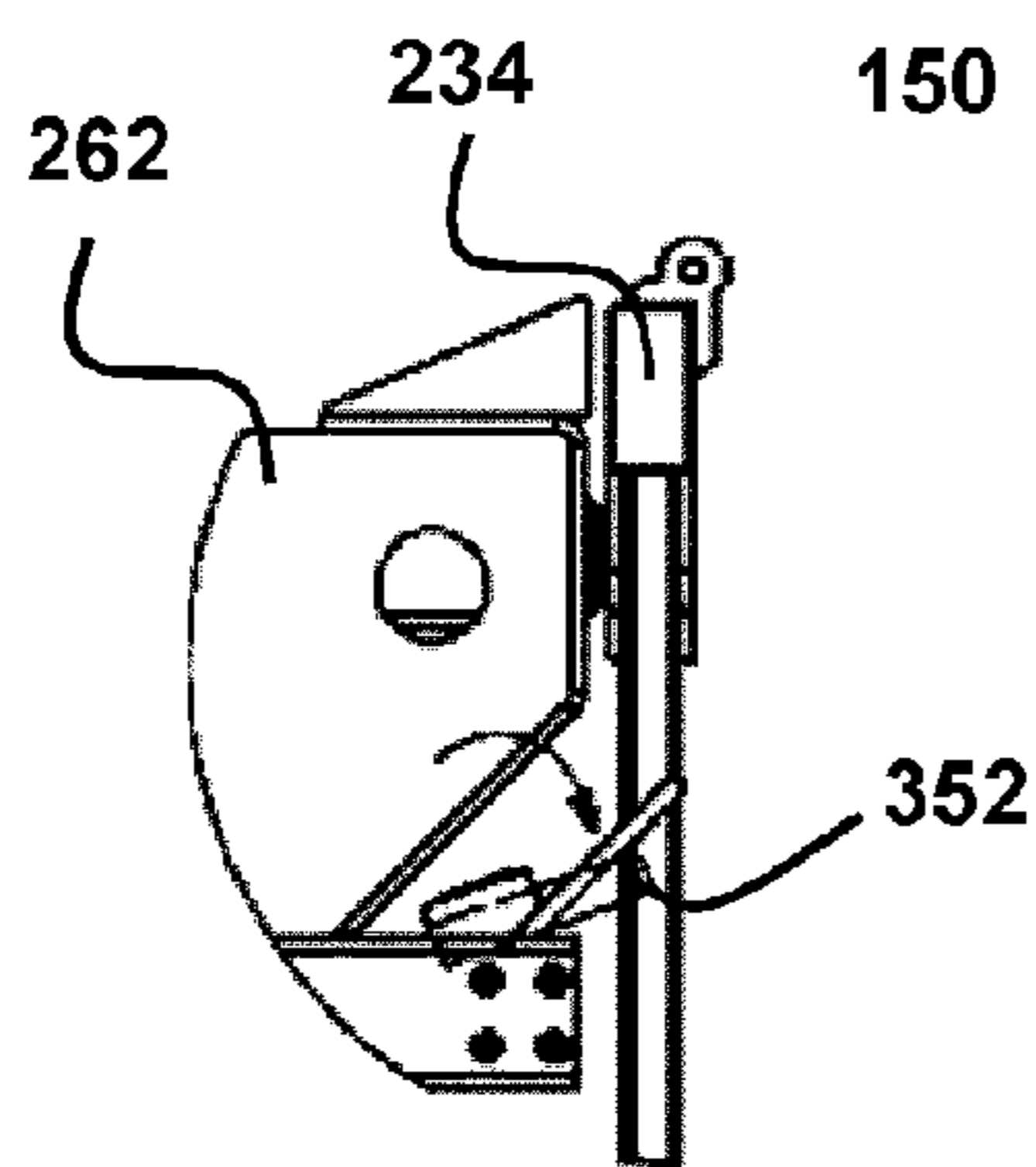


FIG. 71

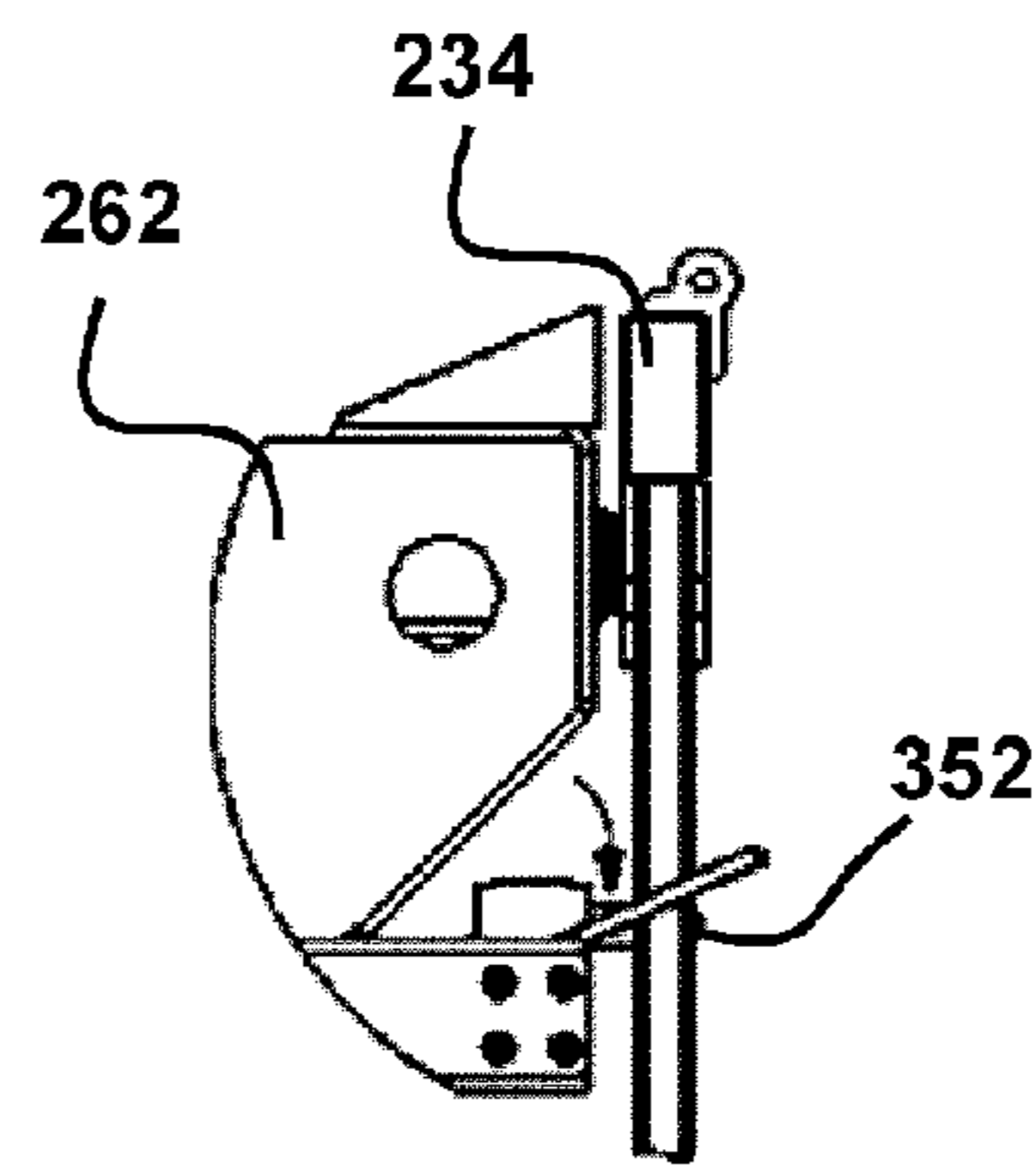


FIG. 72

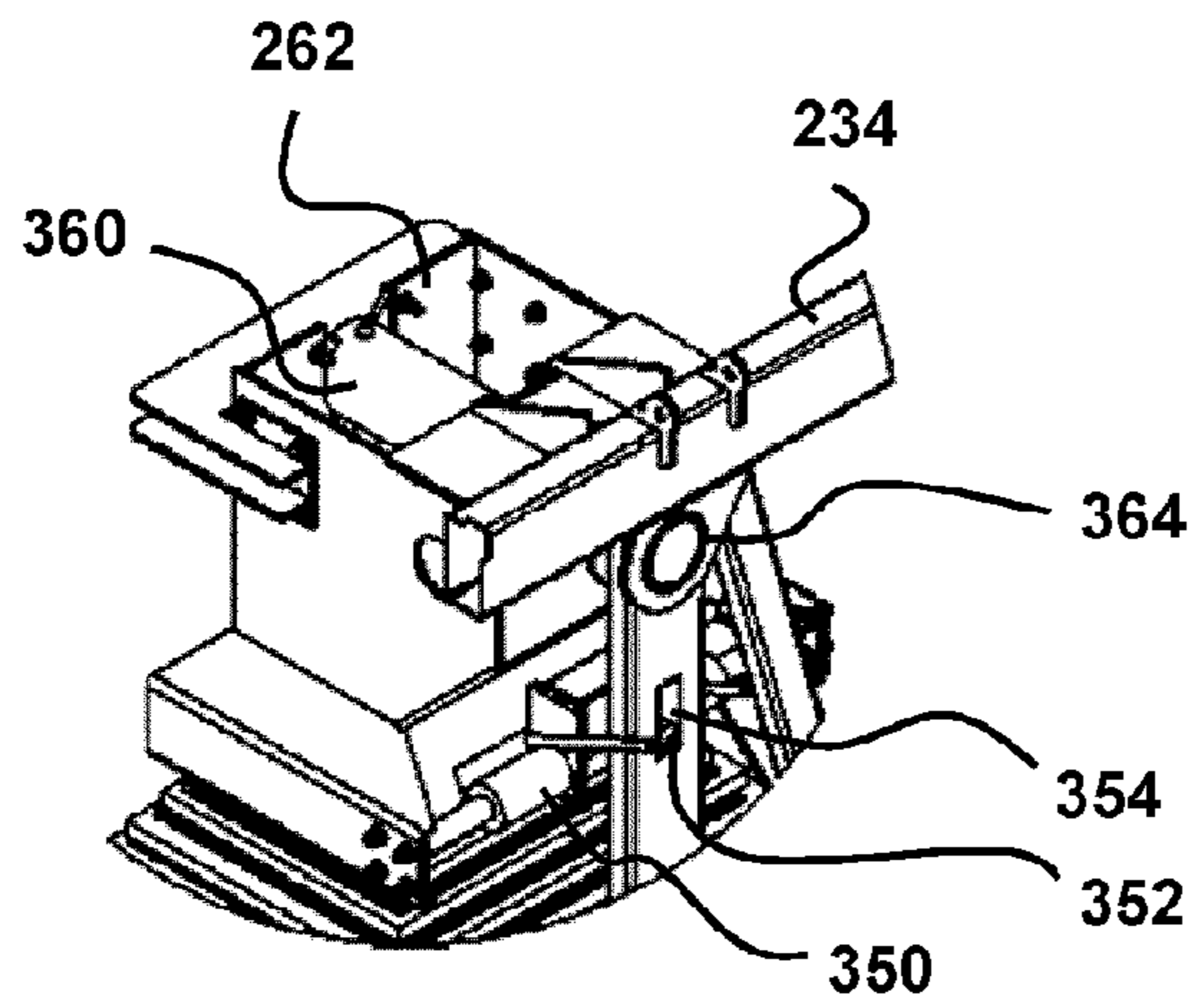


FIG. 73

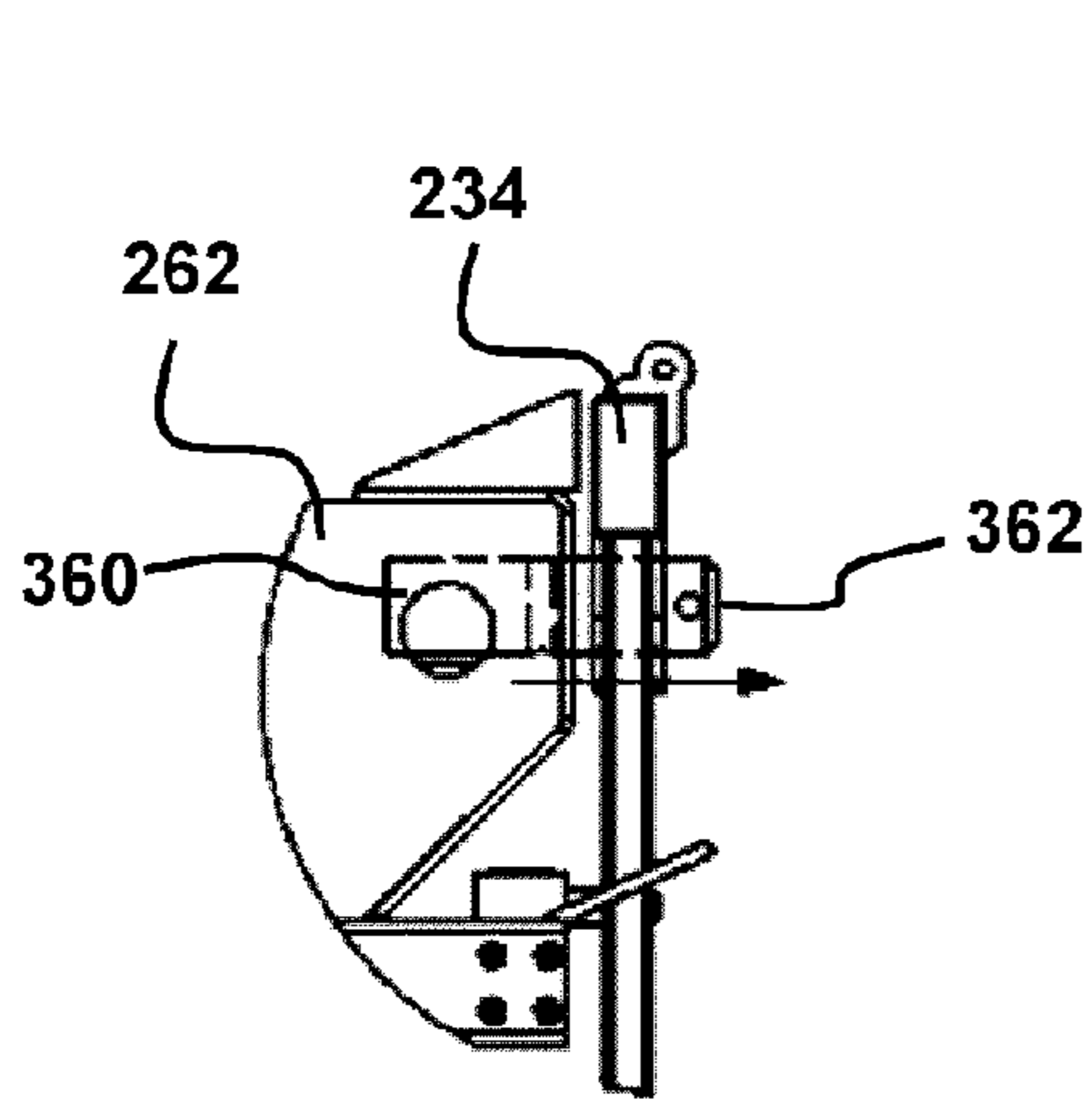


FIG. 74

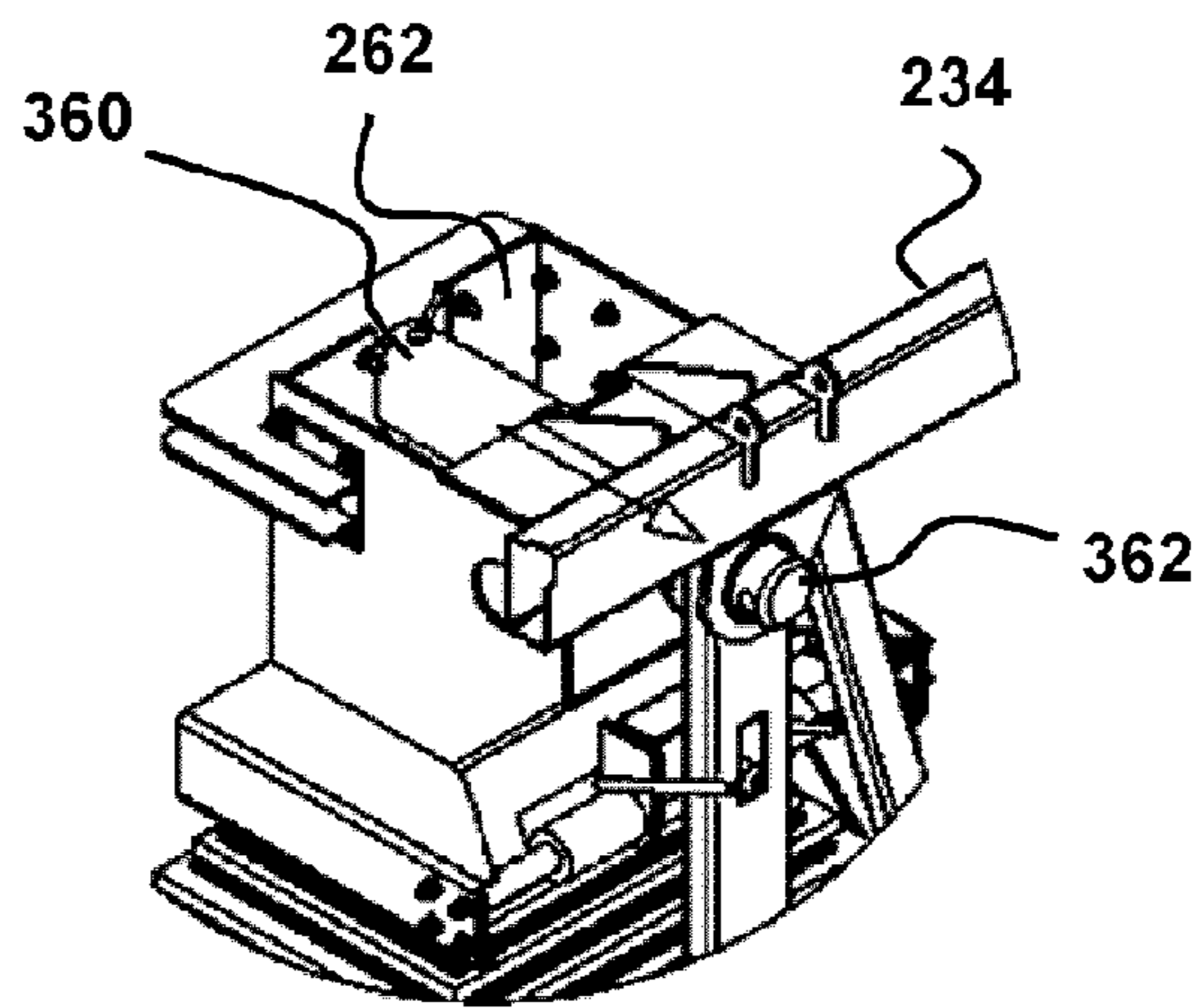


FIG. 75

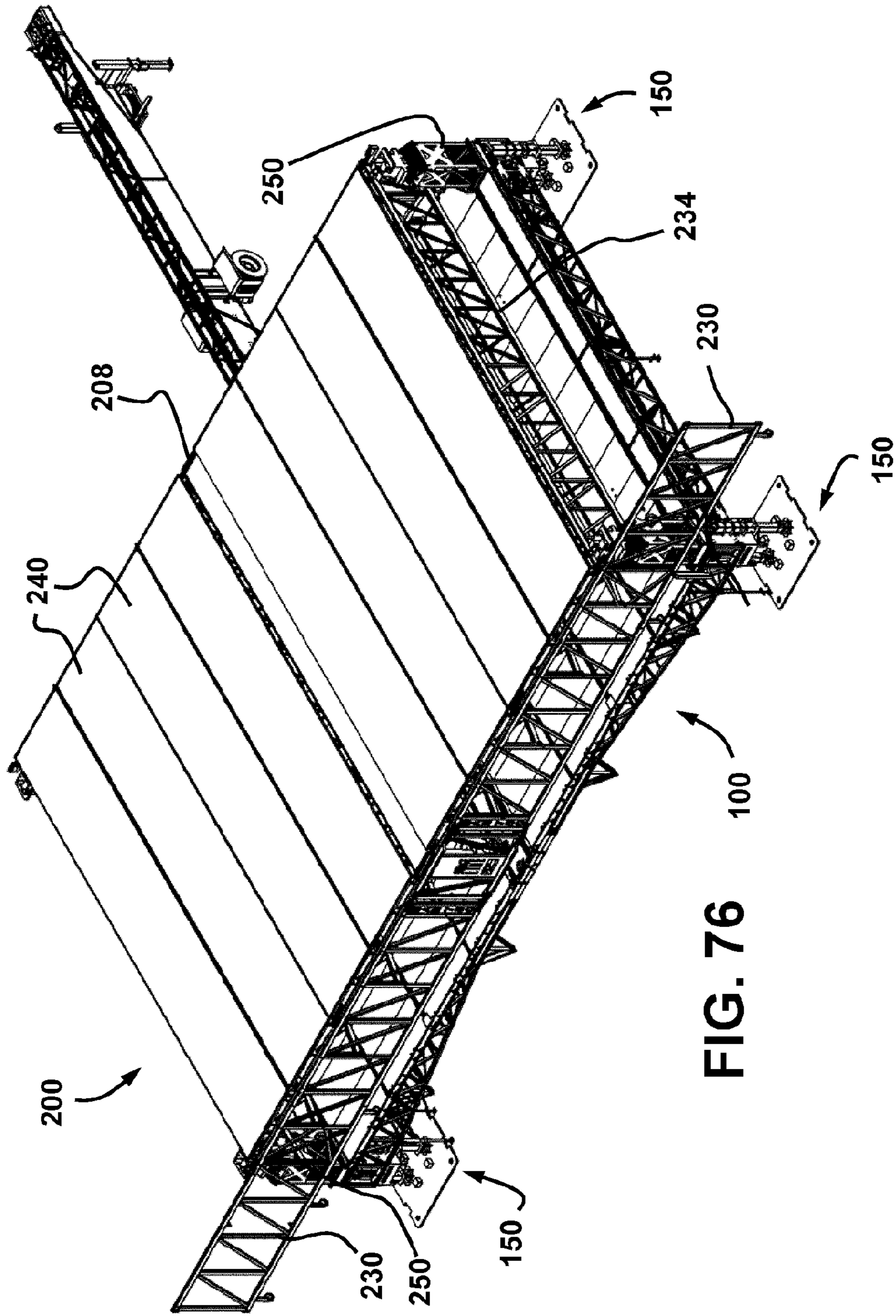


FIG. 76

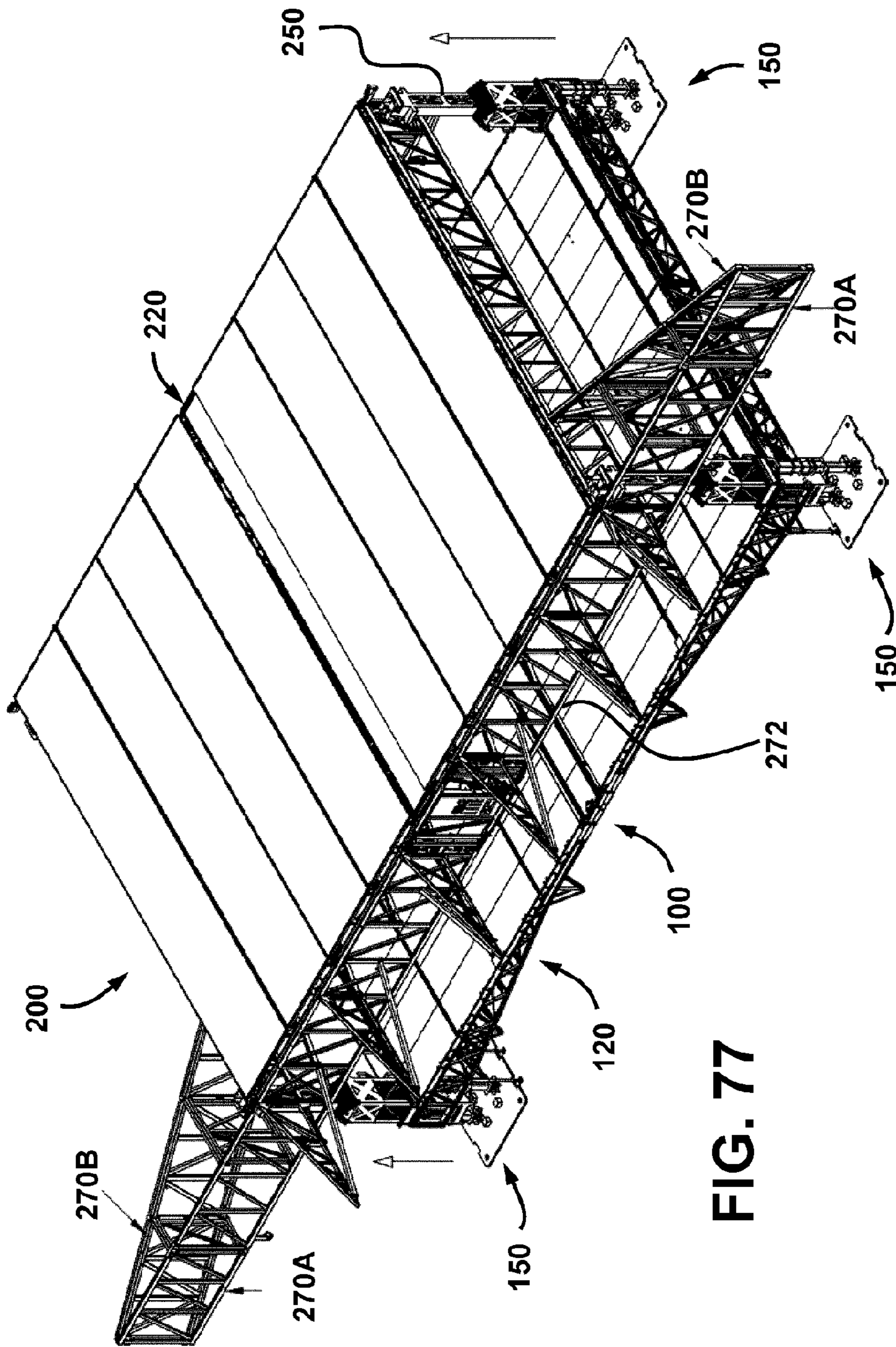


FIG. 77

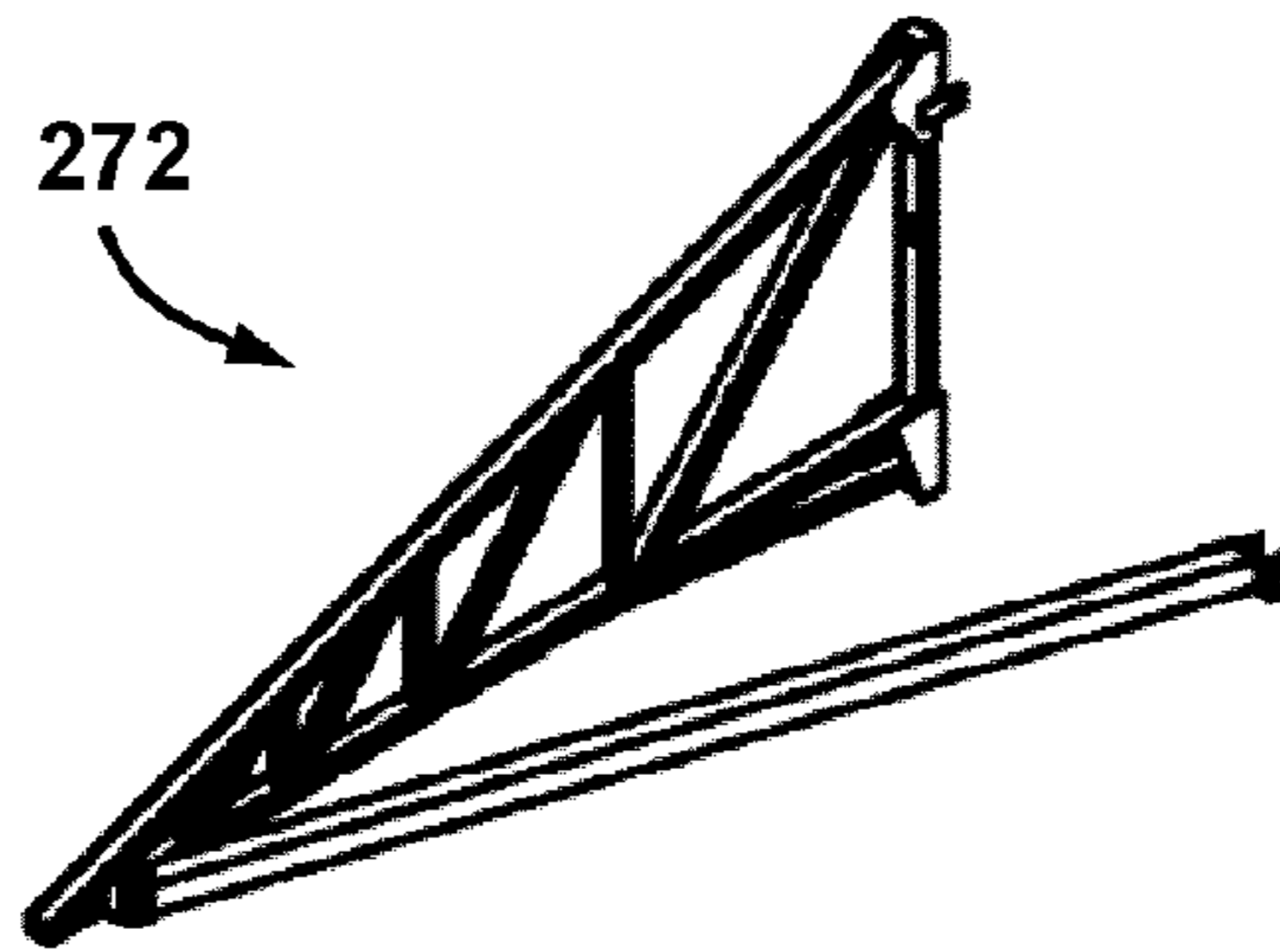


FIG. 78

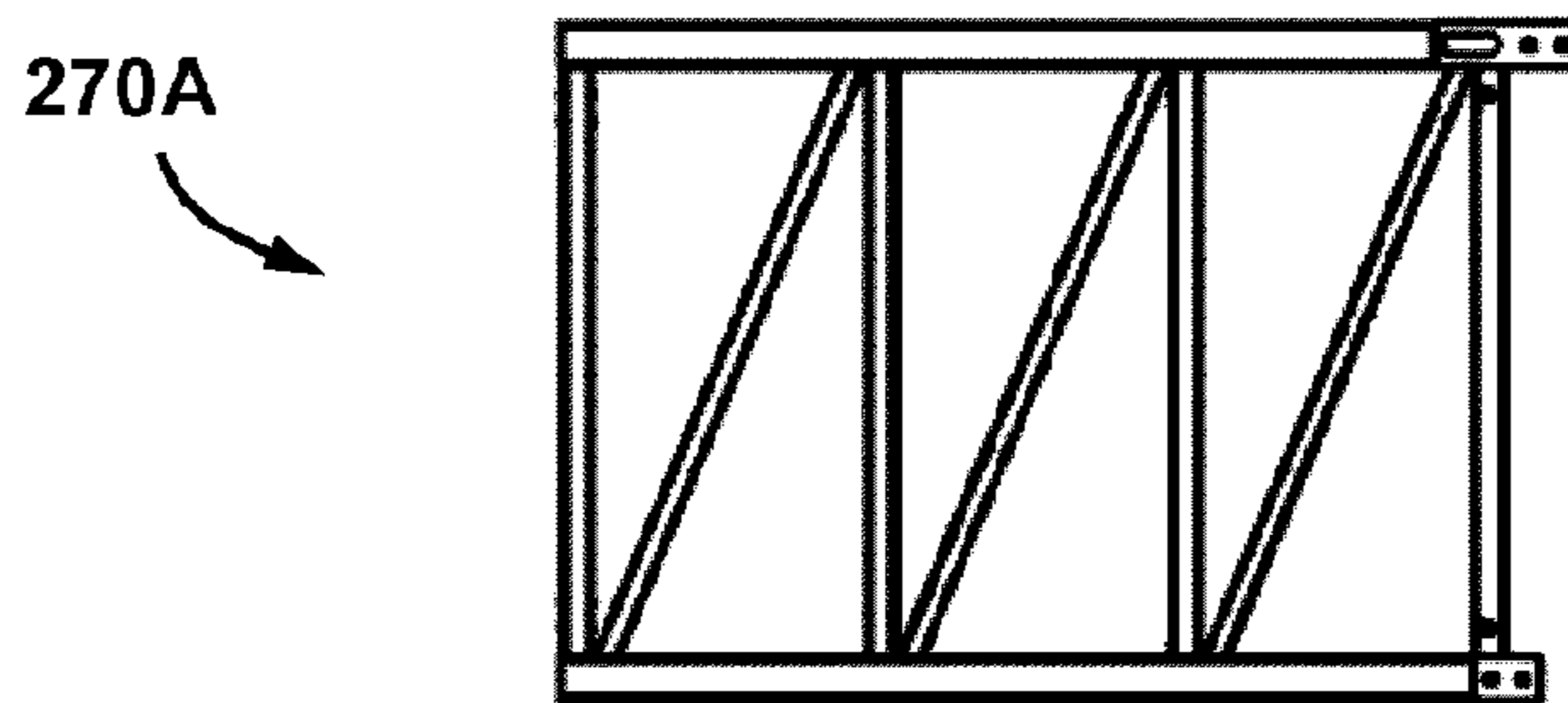


FIG. 79

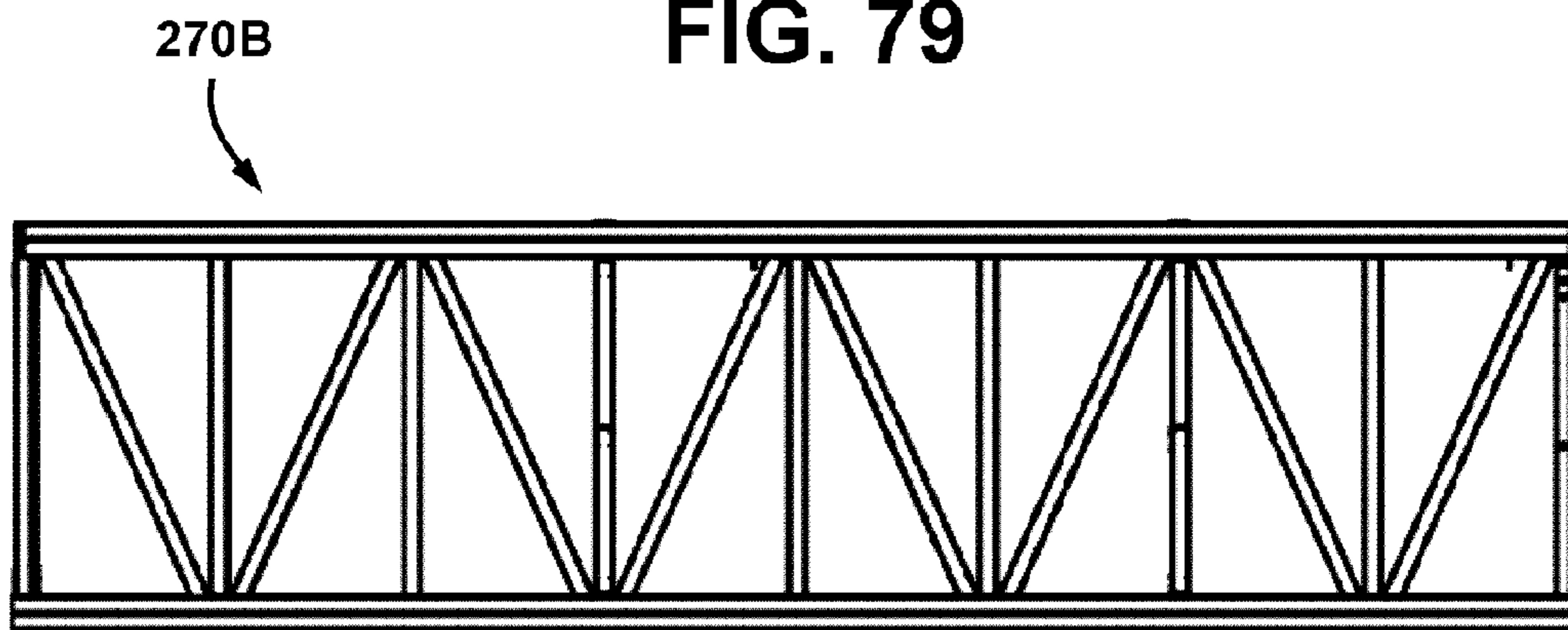


FIG. 80

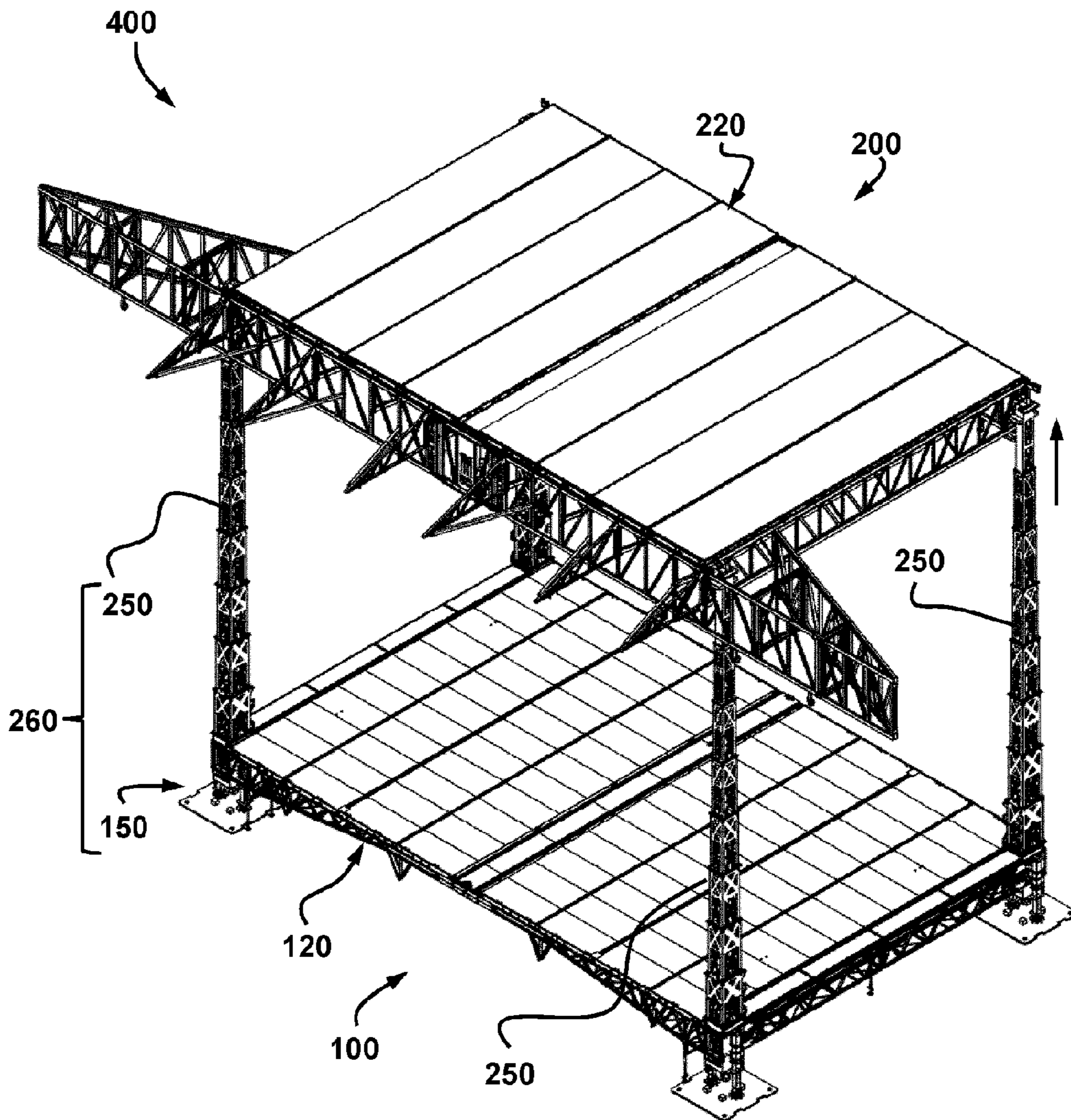


FIG. 81

MOBILE STAGE FRAMEWORK AND METHOD OF HANDLING

CROSS REFERENCE TO PRIOR APPLICATIONS

This application is a national stage filing under Section 371 of International Patent Application No. PCT/CA2014/050158 filed on 3 Mar. 2014 and published in English as WO 2014/131135 A1 on 4 Sep. 2014. PCT/CA2014/050158 claims priority to U.S. patent application No. 61/771,675 filed on 1 Mar. 2013. The entire contents of PCT/CA2014/050158 and of U.S. patent application No. 61/771,675 are incorporated herein by reference in their entirety.

TECHNICAL FIELD

The technical field relates generally to mobile stage frameworks and to methods of handling mobile stage frameworks.

BACKGROUND

A mobile stage can be generally defined as a transportable construction to be assembled and disassembled at designated locations, generally outdoors, so as to provide a place where people such as musicians, actors, entertainers, politicians and spokespersons, to name just a few, can appear in front of a live audience. A mobile stage has a framework that generally includes an overhead roof structure supported by column structures and an elevated floor structure. The roof structure can provide a support for scenic equipment such as lights, wide screens, speakers and others, depending on the nature of the event and the venue.

Different arrangements have been suggested over the years in an attempt to simplify the handling of mobile stages as well as to minimize time and labor costs associated with assembling and disassembling them, especially when the mobile stages are only required for a relatively brief period of time at the same location and must be continuously relocated from one site to another. This resulted in a number of arrangements involving foldable frameworks integrated on a chassis that can be hauled by a truck tractor or by another vehicle. Many of these mobile stages are designed to reduce time and labor costs compared to arrangements that require a very large number of small individual parts to be transported and assembled on-site. Examples of mobile stages include U.S. Pat. No. 4,026,076 (Analetto) published on 31 May 1977, U.S. Pat. No. 5,947,502 (Kammerzell et al.) published on 7 Sep. 1999, EP-1754845 A1 (Sada Casabon) published on 21 Feb. 2007, and EP-2277739 A1 (Laorden Gomez et al.) published on 26 Jan. 2011, to name just a few.

One of the challenges in the design of a mobile stage is the ability of transporting it easily in a folded configuration, particularly on roads. A mobile stage constructed on a semitrailer chassis to be hauled by a truck tractor must comply with various requirements associated with transporting a load on roads, such as the overall dimensions, the maximum weight per axle, etc. Oversized and/or overweight semitrailers can still be permitted on some roads under certain conditions. However, having a mobile stage on an oversized and/or overweight semitrailer is generally undesirable since this complicates the transportation process and can significantly increase the transportation costs, especially if the mobile stage must be frequently relocated from one site to another. Very large mobile stages are often used, for

instance, by popular rock bands for worldwide concert tours. Having an oversized and/or overweight load in such context can create undesirable complications. Thus, transport-related factors can create many challenges in the design and the handling of some mobile stages when using existing approaches, particularly for mobile stages having a framework that is relatively large in size.

Accordingly, there is still room for many improvements in this area of technology.

SUMMARY

The proposed concept provides a new approach in the design and the handling of a mobile stage framework. This approach involves the use of multiple independently transportable and self-contained units, one including an articulated floor structure and another one including an articulated roof structure.

In one aspect, there is provided a mobile stage framework having a lengthwise direction and a widthwise direction, the mobile stage framework including: a plurality of spaced-apart column structures; and a first and a second self-contained unit, both units being separated from one another when the mobile stage framework is fully disassembled for transportation, the first unit including an articulated floor structure having a folded transport configuration and a deployed working configuration, the second unit including an articulated roof structure having a folded transport configuration and a deployed working configuration, the floor structure and the roof structure each being in their deployed working configuration when the mobile stage framework is fully assembled and being in their folded transport configuration when the mobile stage framework is fully disassembled for transportation, the floor structure being removably secured to the column structures at first locations and the roof structure being removably secured to the column structures at second locations as well as being positioned directly above the floor structure when the mobile stage framework is fully assembled, the second locations being vertically above the first locations and being vertically movable with reference to the first locations when the mobile stage framework is being assembled and disassembled, the whole second unit being also laterally movable into and out of position above the first unit when the roof structure is unattached to the column structures and the mobile stage framework is being assembled and disassembled, respectively.

In another aspect, there is provided a method of handling a mobile stage framework during assembly, the method including: positioning a first transportable unit at a location, the first unit including an articulated floor structure that is in a folded transport configuration when the first unit is positioned at the location; securing the floor structure of the first unit to a plurality of spaced-apart column structures; positioning a second transportable unit over the first unit, the second unit including a roof structure and being physically separated from the first unit before the positioning of the second unit; securing the second unit to the plurality of column structures when the roof structure is in a deployed working configuration and at a low-level vertical position above the floor structure of the first unit, the floor structure being already secured to the column structures; and moving the roof structure to a high-level vertical position above the floor structure.

In another aspect, there is provided a mobile stage framework having a lengthwise direction and a widthwise direction, the mobile stage framework including: a plurality of

spaced-apart column structures; and a first and a second separately transportable unit, each unit having a folded transport position and an unfolded working position, the first unit including a floor structure to be removably connected to the column structures when the first unit is in its unfolded working position, the second unit being slidable in and out of position over the first unit when the first unit is in its unfolded working position and the second unit is in its folded transport position, the second unit including a roof structure to be removably connected to the column structures when the second unit is in its unfolded working position.

In another aspect, there is provided a method of handling a mobile stage framework, the method including: positioning a first transportable unit at a location while the first unit is in a folded transport position, the first unit including a floor structure; setting the first unit in an unfolded working position; positioning a second transportable unit over the unfolded first unit while the second unit is in a folded transport position, the second unit including a roof structure and being physically separated from the first unit before the positioning of the second unit; and setting the second unit in an unfolded working position where the roof structure is located above the floor structure of the first unit.

The proposed concept also includes many other aspects and inventive features. Details on the various aspects and features of the proposed concept will be apparent and understood from the following detailed description and the appended figures.

BRIEF DESCRIPTION OF THE FIGURES

FIG. 1 is an isometric view illustrating an example of a first self-contained unit that is part of the framework of a mobile stage incorporating the proposed concept;

FIG. 2 is an enlarged isometric view of the first unit shown in FIG. 1;

FIG. 3 is a view similar to FIG. 1 but with the rear supporting legs being lowered to raise the rear wheels above the ground;

FIG. 4 is an isometric view of the first unit of FIG. 1 but without the parts above the base platform for the sake of illustration;

FIG. 5 is a top view of the first unit as shown in FIG. 4;

FIG. 6 is an isometric view showing some of the joists being opened and supported;

FIG. 7 is a top view of the first unit as shown in FIG. 6;

FIG. 8 is an isometric view showing the joists being fully opened;

FIG. 9 is an isometric view showing the floor panels being moved towards their horizontal working position;

FIG. 10 is an enlarged isometric view showing one of the actuators of FIG. 9 and other adjacent components;

FIG. 11 is a bottom view of what is shown in FIG. 10;

FIG. 12 is an enlarged isometric view showing an example of the bottom junction between two of the adjacent floor panels of FIG. 9;

FIG. 13 is an isometric view illustrating an example of a bottom panel hinge between two of the adjacent floor panels of FIG. 9;

FIG. 14 is an enlarged isometric view of the bottom panel hinge shown in FIG. 13;

FIG. 15 is an enlarged isometric view showing the last one of the floor panels of one of the sets of floor panels in FIG. 9;

FIG. 16 is an isometric view illustrating an example of a column base for use with the first unit of FIG. 1;

FIG. 17 is an enlarged isometric view of one of the telescopic supports of the column base of FIG. 16;

FIG. 18 is an isometric view of the actuator inside the telescopic support of FIG. 17;

FIG. 19 is an isometric view of one of the sockets of FIG. 16 with its corresponding weight-supporting ball;

FIG. 20 is an isometric view of the weight-supporting ball of FIG. 19;

FIG. 21 is an isometric view showing some of the first joists of FIG. 8 being removably secured to the column base of FIG. 16;

FIG. 22 is an isometric view showing the floor panels being in their horizontal working position and showing other elements being added to the floor structure;

FIG. 23 illustrates the first unit of FIG. 1 with the floor structure in its deployed working configuration;

FIG. 24 illustrates an example of a second self-contained unit that is part of the framework of the mobile stage, the second unit being shown approaching the rear side of the first unit of FIG. 23;

FIG. 25 is a side view of the second unit shown in FIG. 24;

FIG. 26 is an isometric view of some of the parts of the second semitrailer on which the second unit is transported in FIG. 24 and also illustrates the two carriage assemblies of the second unit;

FIG. 27 is an isometric view of the front carriage assembly of FIG. 26, the front carriage assembly being shown in a low-level vertical position;

FIG. 28 is a view similar to FIG. 27, showing the front carriage assembly in a higher vertical position;

FIG. 29 is an enlarged isometric view of the front carriage assembly of FIG. 26 located over the second semitrailer of FIG. 24;

FIG. 30 is an enlarged and partially cutaway isometric view of the rear of the second semitrailer to show the transversal alignment actuators and the rear connection actuator;

FIG. 31 is an enlarged isometric view showing the alignment of the second unit with reference to the center of the first unit;

FIG. 32 is an isometric view showing the supporting legs of the second semitrailer being lowered to raise the second semitrailer and the second unit above the ground;

FIG. 33 is an enlarged isometric view showing one of the rear supporting legs of the second semitrailer;

FIG. 34 is an isometric view showing the second unit being raised with reference to the second semitrailer before its transfer onto the first unit;

FIG. 35 is a side view of the second unit shown in FIG. 34 before its transfer onto the first unit;

FIG. 36 is an enlarged side view of the front carriage assembly of FIG. 35 after the second unit is raised for its positioning onto the first unit;

FIG. 37 is a longitudinal side view of the first and second units shown in FIG. 36;

FIG. 38 is a longitudinal cross-sectional side view of the first and second units shown in FIG. 37;

FIG. 39 is a view similar to FIG. 28 and shows the first cable wound around pulleys provided on the front carriage assembly of FIG. 29;

FIG. 40 is an enlarged isometric view showing the attachment point on the first unit for the free end of the first cable;

FIG. 41 is an isometric view showing the second unit during its positioning over the first unit;

FIG. 42 is an isometric view showing the second unit at the end of its positioning over the first unit;

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FIG. 43 is an isometric view showing the second unit being unfolded;

FIG. 44 is an enlarged isometric view showing one of the caster wheels engaging the upper stage floor surface;

FIG. 45 is an enlarged view of the caster wheel shown in FIG. 44;

FIG. 46 shows various components of the roof structure being moved in the widthwise direction towards their deployed working position;

FIG. 47 is an isometric view showing the roof structure without the front and rear transversal trusses, which were omitted for the sake of illustration;

FIG. 48 is a side view of what is shown in FIG. 47;

FIG. 49 is an isometric view showing the various components of the roof structure of FIG. 46 when it is in its deployed working configuration;

FIG. 50 is a front view of the roof structure of FIG. 49;

FIG. 51 is a rear view of the roof structure of FIG. 49;

FIG. 52 is a side view of the roof base structure of FIG. 49;

FIG. 53 is a side view of one of the first longitudinal trusses of FIG. 49;

FIG. 54 is a side view of one of the second longitudinal trusses of FIG. 49;

FIG. 55 is a side view of one of the third longitudinal trusses of FIG. 49;

FIG. 56 is a side view of one of the fourth longitudinal trusses of FIG. 49;

FIG. 57 is an enlarged isometric view showing one of the bogies engaging the top rail over the front transversal truss of FIG. 49;

FIG. 58 is a side view of the bogie of FIG. 57;

FIG. 59 is a cross-sectional view taken along line 59-59 in FIG. 58;

FIG. 60 is an isometric view showing an example of the cross braces and a rigging beam provided between one of the third longitudinal trusses and its two adjacent fourth longitudinal trusses;

FIG. 61 is a front view of the arrangement shown in FIG. 60;

FIG. 62 is an isometric view showing the second unit with the roof structure in its deployed working configuration;

FIG. 63 is an isometric view showing an example of one of the telescopic columns and its corresponding column base being secured together to form a column structure;

FIG. 64 is an isometric view showing the column structure of FIG. 63 once assembled;

FIGS. 65 to 75 show an example of how the column structures can be secured at opposite ends of one of the first longitudinal trusses of the roof structure;

FIG. 76 is an isometric view showing the first and second units once the column structures and the roof structure are secured together;

FIG. 77 is an isometric view showing the roof structure being slightly lifted above the floor structure;

FIG. 78 is an isometric view of one of the front supports that was added in FIG. 77;

FIG. 79 is an isometric view of the front member of one of the side wings that was added in FIG. 77;

FIG. 80 is an isometric view of the rear member of one of the side wings that was added in FIG. 77;

FIG. 81 is an isometric view showing the mobile stage framework once the floor structure and the roof structures are in their deployed working configuration and the columns of the column structures were extended to lift the roof structure.

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DETAILED DESCRIPTION

The approach of the proposed concept is to provide most of the structural components of a mobile stage framework on multiple independently transportable and self-contained units, one including an articulated floor structure and another one including an articulated roof structure. The majority of the components of the mobile stage framework are then transported on site in these two complementary units, each being designed to be hauled by a corresponding truck tractor or be otherwise moved on or by another kind of vehicle. The other components of the mobile stage can be transported in one or more other semitrailers or the like. This includes handrails, stairs, back and side covers, etc.

FIGS. 1 to 81 illustrate the details of an example of an implementation incorporating the proposed concept. This mobile stage framework is constructed using two complementary units 100, 200 mounted on a corresponding semitrailer chassis for road transportation. Its other components are transported on two additional semitrailers. Thus, four truck tractors are required for moving all the parts of this mobile stage. Variants are possible as well.

FIG. 1 is an isometric view of the first unit 100. It is shown in a folded transport configuration. In this example, the first unit 100 is integrated on a first semitrailer 102 configured for road transportation.

The first semitrailer 102 includes a first chassis 104 (FIG. 4) and a corresponding set of rear wheels 106. It also includes other parts commonly found on semitrailers, such as lights, brakes, etc.

It should be noted that the center of gravity of the first semitrailer 102 will be relative high because of the presence of the first unit 100 thereon. The suspension of the rear wheels 106 is thus configured accordingly. The suspension can be for instance similar to the one often used on concrete trucks or on other vehicles having a relatively high center of gravity. Variants are possible as well.

The front end of the first semitrailer 102 is at the left in FIG. 1. In the illustrated example, the front end of the first semitrailer 102 corresponds to what will be the front center of the mobile stage (i.e. the side facing the audience). The longitudinal axis of the first semitrailer 102, which extends horizontally at its center, defines what is referred to as the lengthwise direction of the mobile stage framework. The lengthwise direction is shown in FIG. 1 using arrow 110. Arrow 112 represents the widthwise direction of the mobile stage framework, which widthwise direction 112 is orthogonal to the lengthwise direction 110. The widthwise direction 112 can be from the center of the first semitrailer 102 towards the left, or from the center of the first semitrailer 102 towards the right, depending on the context.

FIG. 1 shows the first unit 100 after it was parked at the location where the mobile stage is needed. The truck tractor (not shown) was detached from the first semitrailer 102 and moved away from it.

The front end of the first semitrailer 102 will be supported by a pair of front vertically-extending supporting legs 114. The front supporting legs 114 are telescopic and are adjustable in length. The bottom end of the front supporting legs 114 can rest on one or more supporting blocks 118 (FIG. 3) to prevent the front supporting legs 114 from sinking into a soft or soften ground and/or from damaging the ground surface. These blocks 118 can be made for instance of wood or other materials. Variants are possible as well.

As aforesaid, the first unit 100 includes an articulated floor structure 120 that is in a folded transport configuration in FIG. 1. The floor structure 120 of the illustrated example

is integrated onto an elongated base platform **130**, which base platform **130** extends in the lengthwise direction **110**. The base platform **130** is located at the center of the floor structure **120**. The floor structure **120** includes two sets of floor panels **132**. One set is on the left side of the base platform **130** and one set is on the right side thereof. The deployment of these floor panels **132** will create the major portion of the upper stage floor surface.

Initially, when the floor structure **120** is in its folded transport configuration, all floor panels **132** of each set are in a vertical transport position and are compactly folded against one another. The adjacent floor panels **132** are then juxtaposed side-to-side. The two innermost floor panels **132** (i.e. the first ones of each set) are spaced apart from one another. The space between them can be used as a storage bay for other components, for instance like the storage bay **122** that extends substantially along an entire length of the base platform **130** in the illustrated example. In FIG. 1, the front end and the rear end of the storage bay **122** are closed by corresponding front and rear end panels **108**, **109** removably secured to the base platform **130**. These end panels **108**, **109** are for transportation purposes but they are also used in the illustrated example to prevent the two sets of floor panels **132** from pivoting inwards around the hinges that connect the two innermost ones of the floor panels **132** to the base platform **130**. Thus, the end panels **108**, **109** will be kept in place at least until the floor panels **132** are moved away from their vertical transport position.

When the floor structure **120** is in its deployed working configuration, all floor panels **132** will be in a horizontal working position and their top surfaces will be coplanar. The floor panels **132** of each set are juxtaposed end-to-end.

In the illustrated example, each floor panel **132** is made of a plurality of smaller floor panel sub-sections connected at mating side edges to form each elongated floor panel **132**. These floor panels **132** have a lengthwise dimension that is substantially similar to that of the base platform **130**. Thus, the floor panels **132** of the illustrated example extend over the full length of the first unit **100**. Each floor panel **132** also has an underlying frame, for instance made of metallic beams or the like. The upper surface of each floor panel **132** can be made of plywood boards or the like that are attached to the frame. Variants are possible as well.

FIG. 2 is an enlarged isometric view of the front end of the first unit **100**. It shows that transversal straps **124** are used in this example to secure the floor panels **132** in their vertical transport position. Variants are possible as well.

FIG. 3 is a view similar to FIG. 1 but shows the rear end of the first semitrailer **102** being supported by a pair of rear vertical supporting legs **116**. The rear vertical supporting legs **116** in the illustrated example are lowered to raise the rear wheels **106** off the ground. Supporting blocks (not shown) can be provided between the bottom end of the rear supporting legs **116** and the ground. The base platform **130** is then leveled by adjusting the height of the front and rear vertical supporting legs **114**, **116**.

As can be seen in FIGS. 1 and 3, the floor structure **120** includes a plurality of joists that are transported on each side of the first unit **100** in the illustrated example. Other parts are also present as well on the sides of the first unit **100**.

Two sets of joists **140**, **142** are provided in the illustrated floor structure **120** to support the floor panels **132** when they are in their horizontal working position. One set of joists **140**, **142** is on the left side of the base platform **130** and one set of joists **140**, **142** is on the right side thereof. Each set of the illustrated example includes a plurality of first joists **140** and one second joist **142**. The second joist **142** is located at

the center. One of the second joists **142** can be seen in a folded stowed position in FIG. 4. A total of eight joists **140** and two joists **142** are provided in the illustrated example. Variants are possible as well. For instance, the number, the shape and/or the spacing of the joists can be different in other implementations.

Initially, when the floor structure **120** is in its folded transport configuration, as shown for instance in FIG. 1, the joists **140**, **142** extend longitudinally against the sides of the base platform **130** for transportation. The joists **140**, **142** are thus parallel to the lengthwise direction and are very compact in this position.

FIG. 4 is an isometric view of the first unit **100** but without the parts above the base platform **130** for the sake of illustration. FIG. 4 shows the chassis **104** of the first semitrailer **102**. The chassis **104** includes two spaced-apart main frame rails. The main frame rails extend longitudinally in the first semitrailer **102** and they are interconnected by a plurality of crossbeams.

FIG. 5 is a top view of the first unit as shown in FIG. 4.

The first unit **100** is designed to be as autonomous as possible. In the illustrated example, equipment such as a diesel power generator, batteries and a hydraulic system having pumps, reservoirs, valves and other features commonly found in hydraulic systems, to name just a few, are provided in-between the two main frame rails of the chassis **104**. The various circuits and valves can be controlled using, for instance, a wireless remote console. Variants are possible as well. The hydraulic reservoirs are designed in independent sections in the event of a leak. The hydraulic system of the first unit **100** will also provide the pressurized hydraulic fluid for the second unit **200** later in the assembly. All hydraulic actuators of the first and second units **100**, **200** are connected to the hydraulic system of the first unit **100**. The front and rear vertical supporting legs **114**, **116** of the first semitrailer **102** are also powered by this hydraulic system. However, the second semitrailer in the illustrated example uses another hydraulic system for his supporting legs. Variants are possible as well.

FIG. 6 is an isometric view showing the joists **140** being opened. The proximal end of the first joists **140** are pivotally connected to the base platform **130**. FIG. 6 also shows the brackets **144** that are provided on each side of the base platform **130** to support the first joists **140** when the floor structure **120** is in its folded transport configuration. In the illustrated example, the lower half of these brackets **144** is slidable from a horizontal position to a position towards the vertical where it can get under the first joists **140** using a hydraulic actuator. Although the hinges at the proximal ends of the first joists **140** are very strong, the weight of each first joist **140** can be very important, particularly in large implementations. The distal end of the first joists **140** will thus tend to be slightly lower than the proximal end thereof. The hydraulic actuator of the brackets **144** will lift them during transportation but will release them for unfolding the first unit **100**. The handling of the first unit **100** is thus greatly facilitated.

FIG. 6 further shows one of the vertical retractable stands **126** provided under the first semitrailer **102**. Each of these stands **126** can be manually operated using a corresponding actuator to lower or lift it with reference to the ground. Only one of these stands **126** is shown. However, the first unit **100** can include numerous stands **126**. Supporting blocks (not shown) can be provided between the bottom end of the stands **126** and the ground. The stands **126** will assist in supporting the weight of the mobile stage framework.

In the illustrated example, each set also includes four first joists **140**, two near the front end of the base platform **130** and two near the rear end thereof. Second joists **142** are also provided, one on the left side and one on the right side. The second joists **142** are pivotally connected to a corresponding side of the base platform **130** at approximately the center of its length. They are made of two sections pivotally connected end-to-end. Variants are also possible.

FIG. **7** is a top view of the first unit **100** as shown in FIG. **4**. The front end of the first unit **100** is at the bottom of this figure.

FIG. **8** is an isometric view showing the joists **140**, **142** being fully opened and supported. The joists **140**, **142** remain horizontal using a plurality of vertical stands **146**. These stands are installed at various locations along their length immediately after pivoting the joists **140**, **142** to their transversal position. A manually-movable lifting arrangement, for instance one including a winch, can be used to lift the joists **140**, **142** when installing the stands **146**. Variants are possible as well.

FIG. **9** is an isometric view showing the floor panels **132** being moved towards their horizontal working position. In this example, both sides are moved at the same time. Their deployment is made using an arrangement including a plurality of vertically-disposed floor panel hydraulic actuators **180** and linking arms. Variants are also possible.

FIG. **10** is an enlarged isometric view showing one of the actuators **180** of FIG. **9** and other adjacent components. It should be noted that in FIG. **10**, the floor panels **132** are illustrated without their top surface, for instance without the plywood boards. Only their supporting frame is visible but this is simply for the purpose of illustration. FIG. **10** also shows some of the side tabs **181** that are provided under the floor panels **132** of the illustrated example to keep the joists **140**, **142** in alignment with the floor panels **132**.

FIG. **11** is a bottom view of what is shown in FIG. **10**.

During their deployment, the weight of the floor panels **132** is supported in most part by the first joists **140** and the second joists **142**. The actuators **180** and the linking arms **182**, **184** also hold the floor panels **132** and prevent them from dropping due to gravity.

In the illustrated example, each actuator **180** has an upper end pivotally connected to a corresponding upper panel hinge **134** provided between the two adjacent floor panels **132**. The actuator **180** also has a bottom end pivotally connected to a bottom pivot **188** interconnecting the bottom end of the two corresponding linking arms **182**, **184**. Each linking arm **182**, **184** has an upper end pivotally connected to a respective one of the adjacent floor panels **132** using corresponding pivots **183**, **185**.

When the floor panels **132** are in their vertical transport position, the actuators **180** are fully extended. The linking arms **182**, **184** of each subassembly are then almost parallel to one another and are inside corresponding spaces **189** in the underlying frame of the floor panels **132**. The floor panels **132** are deployed by contracting the actuators **180** substantially at the same time and/or by small increments. This will move the floor panels **132** outwards and the floor panels **132** will always be supported throughout this deployment. Thus, the use of external machinery, such as cranes, cables or the like, can be omitted for opening the floor panels **132**, unlike existing mobile stages having more than two adjacent floor panels **132** on each side.

FIG. **12** is an enlarged isometric view showing an example of the bottom junction between two of the adjacent floor panels **132** of FIG. **9**. As can be seen, a follower **190** is provided near the bottom junction between the two

adjacent floor panels **132**. In the illustrated example, the follower **190** is a roller and the roller is in engagement with the top edge surface of the corresponding first joist **140**. It rolls thereon during the movement of the floor panels **132**. Similar rollers are provided for engaging the top edge surface of the second joists **142**. Rollers are not the only kind of followers that can be used and in some implementations, one can use or also use sliding cushions or the like.

FIG. **13** is an enlarged bottom isometric view illustrating an example of a bottom panel hinge **136** between two of the adjacent floor panels **132** of FIG. **9**.

FIG. **14** is an enlarged isometric view of the bottom panel hinge **136** shown in FIG. **13**. This bottom panel hinge **136** is designed to hold the floor panels **132** together in any of their possible positions but without having a portion of the hinge protruding above the upper stage floor surface and that could create undesirable obstacles. Thus, the bottom panel hinges **136** are designed to be fully concealed when the floor structure **120** is in its deployed working configuration. They are also very compact when the floor structure **120** is its folded transport configuration.

As shown in FIG. **14**, the bottom panel hinge **136** includes an inboard flat portion **136A** and an outboard flat portion **136B**. Both portions have a similar construction in the illustrated example. Their top surfaces will extend flush with the upper stage floor surface when the floor panels **132** are in their horizontal working position. A T-shaped bracket **136C**, **136D** is provided under each flat portion **136A**, **136B** to connect it to the corresponding floor panel **132**, for instance using bolts or the like. Each bracket **136C**, **136D** also includes a transversally-disposed inner flange having a rectilinear slot **136E**, **136F**. The slots **136E**, **136F** receive a slide pin provided at the free end of a corresponding lever arm **136G**, **136H** that is pivotally connected to the opposite bracket **136D**, **136C**, respectively. The lever arms **136G**, **136H** are in an inverted position with reference to one other. Both lever arms **136G**, **136H** are pivotally connected together using a medial axle pivot **136I**. The medial axle **136I** extends horizontally and parallel to the pivot axis of the floor panels **132**. Changing the relative angle between the floor panels **132** will pivot the pivot axes **136J**, **136K**. The various components of the bottom panel hinge **136** are configured and disposed so as not to interfere with the relative movements of the floor panels **132**. Variants are possible as well.

FIG. **15** is an enlarged isometric view showing the last one of the floor panels **132** of one of the sets of floor panels in FIG. **9**. It also shows that followers **190** also engage the top edge surface of the joists **140**, **142** at the bottom of the outermost floor panels **132**.

FIG. **15** further also additional joists **192** can be provided. These additional joists **192** can be attached on the left and right sides of the floor structure **120** for reinforcement. They will extend in the lengthwise direction between two of the column bases **150** and they are pivoted 270 degrees from a transport position to a working position in the illustrated example, as schematically depicted in FIG. **22**. Beforehand, the joists **192** were bolted to the last one of the floor panels **132** of each set, as shown. It should be noted that the threaded holes **193** for these bolts are visible in FIG. **22** and also in subsequent figures. The joists **192** can be connected between the column bases **150**, on each side, for instance using plates **195** that are shown in FIG. **22**. Variants are also possible.

FIG. **16** is an isometric view illustrating an example of a column base **150** for use with the first unit **100**. The distal end of each first joist **140** will be connected to a correspond-

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ing one of the column bases **150**. The column bases **150** are part of column structures, as described later in the text. Four column bases **150** are provided in the illustrated example, one for each corner of the mobile stage framework. Variants are possible. For instance, more or less column structures can be required, depending on the implementations. Many other variants are possible as well.

The column bases **150** are transported inside the storage bay **122** in the illustrated first unit **100**. This can be seen for instance in FIGS. **1** to **3** and **6** to **9**. Equipment such as a lift, a crane or the like can be used to move the column bases **150** in or out of the storage bay **122**. Variants are possible and accordingly, the column bases **150** can be transported elsewhere in some implementations.

As can be seen, the illustrated column base **150** includes a vertically-extending frame **152** having a square-shaped cross section and a ground-engaging plate **154**. The ground-engaging plate **154** has a relatively large surface area to distribute the weight on the ground. The connection between the frame **152** and the corresponding plate **154** is made using a pair of vertically-extending telescopic supports **156**, one on each side of the frame **152**. The telescopic supports **156** are positioned opposite one another in the widthwise direction **112**. Variants are possible as well.

FIG. **17** is an enlarged isometric view of one of the telescopic supports **156** of the column base **150** of FIG. **16**. The telescopic support **156** includes two beams having a square cross-section, one being inserted into the other. A hydraulic actuator **158** is provided inside each telescopic support **156**. The top of the actuator **158** is connected to the top beam and the bottom of the actuator **158** is connected to the bottom beam. The bottom beam also includes a plurality of holes **170** for receiving pins (not shown). The pins will hold the weight on the column base **150** at the desired height when the hydraulic pressure will be removed from the actuator **158**. The pins will thus prevent the top beam from sliding downwards too far on the bottom beam.

FIG. **18** is an isometric view of the actuator **158** inside the base support of FIG. **17**. The two actuators **158** of the column base **150** are independently adjustable and fine adjustments can be made when needed to level the column base **150**. Again, variants are possible as well.

The bottom end of each telescopic support **156** rests on the plate **154** through a corresponding socket **162**, as shown in FIG. **16**. Each socket **162** of the illustrated example includes a plurality of radially-disposed vertical flanges creating a central open space that can receive a weight-supporting ball **164**.

FIG. **19** is an isometric view of one of the sockets **162** of FIG. **16** with its corresponding weight-supporting ball **164**.

FIG. **20** is an isometric view of the weight-supporting ball **164** of FIG. **19**. The ball **164** includes a top cylindrical connector **166**, to which the bottom end of the telescopic support **156** is attached, and a bottom ball-shaped portion **168** engaging the inner edges of the flanges of the corresponding socket **162**. This arrangement provides some freedom of movement to compensate for the usual irregularities on the ground. The plate **154** is thus often not necessarily perfectly horizontal on the ground and the orientation of the frame **152** of the column base **150** may need to be adjusted.

FIG. **21** is an isometric view showing some of the first joists **140** being removably secured to the corresponding column base **150**. Bolts (not shown) can be used to removably secure the distal ends of these first joists **140** to opposite sides of the frame **152** of the column base **150**. It should be noted the different assembly methods are possible. For instance, the frame **152** of each column base **150** can be

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bolted to the corresponding joists **140** while the frame **152** is held above the ground using a lift, a crane or the like. Variants are also possible.

FIG. **22** is an isometric view showing the floor panels **132** being in their horizontal working position and showing other elements being added to the floor structure **120**.

The remaining left and right lateral openings between the column bases **150** of the illustrated example are closed using removable side floor sections **194**. Other joists **196**, **198**, **199** are also installed at various locations underneath the floor structure **120** for reinforcement. Variants are possible as well.

FIG. **23** illustrates the floor structure **120** in its deployed working configuration.

FIG. **24** illustrates an example of a second self-contained unit **200** that is part of the framework of the mobile stage. The second unit **200** includes an articulated roof structure **220** for the mobile stage framework. The second unit **200** includes a central roof base frame **208** extending in the lengthwise direction and to which the various mobile components of the second unit **200** are already attached. The illustrated second unit **200** is carried over a second semitrailer **202** that is hauled by a truck tractor **203**. Unlike the first unit **100** of the illustrated example, this second unit **200** will be completely detached from its second semitrailer **202** during the positioning thereof.

In FIG. **24**, the second unit **200** is shown approaching the first unit **100** from the rear side. The second unit **200** is back-up using the truck tractor **203** so as to be oriented in the lengthwise direction and in alignment with the center of the first unit **100**. The front end of the second unit **200** corresponds to the rear end of the second semitrailer **202** in the illustrated example. It should be noted that the second unit **200** could also be loaded from the front side of the first unit **100**. Other variants are possible as well.

FIG. **25** is a side view of the second unit **200** shown in FIG. **24**. As can be seen, this second semitrailer **202** includes a second chassis **204** having a set of second wheels **206** and other components commonly found on semitrailers for road transportation. The second semitrailer **202** includes a pair of front vertically-extending front supporting legs **210** and a pair of vertically-extending rear supporting legs **212**. Variants are possible as well.

FIG. **26** is an isometric view of some of the parts of the second semitrailer **202** on which the second unit **200** is transported in FIG. **24** and also illustrates the two movable carriage assemblies **222**, **224** of the second unit **200**. One is provided at the front of the second unit **200** and the other is provided at the rear thereof, thus opposite the other. They each include two opposite sets of rollers at the bottom. Each set of rollers engage a corresponding one of the longitudinal tracks **214** provided on the second chassis **204**. The weight of the entire second unit **200** rests on the four sets of rollers during the positioning of the second unit **200** over the first unit **100**.

FIG. **27** is an isometric view of the front carriage assembly of FIG. **26** where it is shown in a low-level vertical position. The front carriage assembly **222**, like the rear carriage assembly **224**, includes two pairs of telescopic support beams and corresponding hydraulic actuators located therein, one for each telescopic support beam. The actuators are extended to raise the second unit **200**, away from the second chassis **204**, to a height that is sufficient to clear the top edge of the upper stage floor surface during the positioning. The two telescopic support beams are attached together by a crossbeam.

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FIG. 28 is a view similar to FIG. 27, showing the front carriage assembly 222 in a raised position.

FIG. 29 is an enlarged isometric view of the front carriage assembly 222 of FIGS. 27 and 28 located over the second semitrailer 202. It shows how the sets of rollers engage the corresponding concave track 214 in the illustrated example. Each set of rollers includes a pair of metallic rollers rotating around corresponding horizontal axes, and a pair of metallic rollers rotating around corresponding vertical axes. Variants are possible.

FIG. 30 is an enlarged and partially cutaway isometric view of the rear of the second semitrailer 202 to show that it includes transversal alignment actuators 226 and a rear connection actuator 228. The second unit 200 is not shown in FIG. 30.

The transversal alignment actuators 226 of the illustrated example are each mounted between a corresponding one of the axles of the second semitrailer 202 and a top part of the second chassis 204. Variants are possible as well.

FIG. 31 is an enlarged isometric view illustrating the alignment of the second unit 200 with reference to the center of the first unit 100. This is done before the second unit 200 is positioned onto the first unit 100. When moving the rear of the second semitrailer 202 closer to the edge of the first unit 100, the driver of the truck tractor 203 must keep the second semitrailer 202 in alignment with the center of the first unit 100. However, because the alignment is difficult to achieve with a precision to the millimeter, the second semitrailer 202 is designed to be moved sideways using the transversal alignment actuators 226 in order to fine tune the transversal alignment. Variants are possible as well.

FIG. 32 is an isometric view showing the front vertical supporting legs 210 and the rear vertical supporting legs 212 of the second semitrailer 202 being lowered to raise the second semitrailer 202 and the second unit 200 with reference to the ground. Each vertical supporting leg 210, 212 includes a corresponding hydraulic actuator located inside telescopic support beams. Beforehand, the second semitrailer 202 was firmly attached to the first unit 100 using the rear connection actuator 228 (FIGS. 30 and 31). The end of the rear connection actuator 228 extends out at the rear through a hole 229 until it can be connected to a corresponding anchoring point on the side of the first unit 100. FIG. 31 shows the end of the rear connection actuator 228 being extended. Retracting the end will then bring the second semitrailer 202 and the first unit 100 into a locking engagement. The actuator 228 will be locked into position until the second unit 200 is secured to the rest of the mobile stage framework. Variants are possible as well.

FIG. 33 is an enlarged isometric view showing one of the rear supporting legs 212 of the second semitrailer 202. The bottom of the front vertical supporting legs 210 and the rear vertical supporting legs 212 engage the ground using supporting blocks, for instance wood blocks 213 or the like, as shown semi-schematically in FIG. 33. These blocks 213 increase the surface area. FIG. 33 also shows the pin 211 inserted in one of the various holes so as to prevent the rear supporting legs 212 from retracting when the hydraulic pressure inside the actuator is released.

FIG. 34 is an isometric view showing the second unit 200 being raised with reference to the second semitrailer 202 before its positioning onto the first unit 100.

FIG. 35 is a side view of the second unit 200 shown in FIG. 34 before its positioning onto the first unit 100.

FIG. 36 is an enlarged side view of the front carriage assembly in FIG. 35 after the second unit 200 is raised for its positioning on the first unit 100.

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FIG. 37 is a longitudinal side view of the first and second units 100, 200 before the positioning of the second unit 200 onto the first unit 100.

FIG. 38 is a longitudinal cross-sectional side view of the first and second units 100, 200 shown in FIG. 37. FIG. 38 shows the interior of the second unit 200.

As can be seen, the positioning of the second unit 200 of the illustrated example is done using two pull cables 215, 217 and corresponding spaced-apart winches 216, 218 located at the center of the second unit 200, more precisely inside the roof base frame 208. The cables 215, 217 run through a corresponding one of the carriage assemblies 222, 224. The free end of the first cable 215 is attached to the end of the first tracks 138 on the first unit 100 and the free end of the second cable 217 is attached to the end of the second tracks 214 on the second semitrailer 202, which free end is thus completely opposite the free end of the first cable 215. When loading the second unit 200 onto the first unit 100, the first winch 216 will pull the first cable 215 and the second winch 218 will yield an equivalent length of the second cable 217 as the second unit 200 moves. The reverse procedure will be done when loading the second unit 200 back over the second semitrailer 202.

FIG. 39 is a view similar to FIG. 28 and shows the first cable 215 wound around pulleys 219A, 219B provided on the front carriage assembly 222. The rear carriage assembly 224 (FIG. 26) has similar pulleys.

FIG. 40 is an enlarged isometric view showing the attachment point 139 on the first unit 100 for the free end of the first cable 215.

FIG. 41 is an isometric view showing the second unit 200 during its positioning over the first unit 100.

FIG. 42 is an isometric view showing the second unit 200 at the end of its positioning. The second unit 200 is now in position over the first unit 100. The roof structure 220 is still in its folded transport configuration in the illustrated example.

FIG. 43 is an isometric view showing the second unit 200 being unfolded. As can be seen, the roof structure 220 of the second unit 200 includes a plurality of trusses on each side of the roof base frame 208. Among these trusses, there are two sets of transversal trusses 230, 232. One set is at the left of the roof base frame 208 and the other set is at the right thereof. Each set includes a front transversal truss 230 and a rear transversal truss 232. Both transversal trusses 230, 232 extend in the widthwise direction when the mobile stage framework will be fully assembled. Each transversal truss 230, 232 has a proximal end that is pivotally connected to a corresponding side of the roof base frame 208. Variants are possible as well.

Caster wheels 233, 235 are provided to assist in pivoting the trusses 230, 232. The caster wheels 233, 235 are engaging the upper stage floor surface to support some of the weight of the trusses 230, 232. The second unit 200 can be slightly lowered to put the caster wheels 233, 235 in engagement with the upper stage floor surface prior to unfolding the second unit 200. The caster wheels 233, 235 of the illustrated example are also positioned along the trusses 230, 232 so that at least one of them is over or very close to a rigid beam that is part of the floor panel frames. This feature lowers the mechanical stresses that the weight of the trusses 230, 232 can apply over unsupported portions of the floor panels 132, for instance at their center, particularly when plywood boards or other similar materials are used. Variants are possible as well.

FIG. 44 is an enlarged isometric view showing one of the caster wheels 233, 235 engaging the upper stage floor surface.

FIG. 45 is an enlarged view of the caster wheel 235 shown in FIG. 44.

FIG. 46 shows various components of the roof structure 220 being moved in the widthwise direction towards their deployed working position. These components unfold on each side of the roof base structure 208 in a sliding movement. The top edge of the front and rear trusses 230, 232 are used as tracks in the illustrated example. Bogies are provided at the ends and they slide on these tracks. Variants are possible as well.

FIG. 47 is an isometric view showing the roof structure 220 without the front and rear transversal trusses 230, 232 which were omitted only for the sake of illustration.

FIG. 48 is a side view of what is shown in FIG. 47.

FIGS. 47 and 48 show the position of the various longitudinal trusses 234, 236, 238, 240 on each side of the roof base frame 208. These longitudinal trusses 234, 236, 238, 240 are interconnected by rigid roof panels 248. This arrangement is designed to fold in a very compact manner.

Each roof panel 248 can be made of a sheet of fiberglass or the like. It also includes a corresponding underlying frame forming a rigid support under the upper surface thereof and to which trusses can be attached. The roof panels 248 also provide a very good protection against rain and/or sunlight once the mobile stage framework is fully assembled. They perform better than sheets of fabric or the like. The adjacent roof panels 248 used in the illustrated example are pivotally attached two-by-two using corresponding hinges and the second one of each pair is attached to the top end of a corresponding longitudinal truss. With the roof base structure 208 being covered with a fiberglass sheet, the roof panels 248 form altogether a continuous and uninterrupted roof surface once the roof structure 220 is in its deployed working configuration. Variants are possible as well.

In the illustrated example, the last one of the longitudinal trusses on each side is the first longitudinal truss 234. The top end of each first longitudinal truss 234 is in sliding engagement with the top rails of the transversal trusses 230, 232 using bogies. Second longitudinal trusses 236 are also in sliding engagement with the top rails of the transversal trusses 230, 232 using bogies. They are connected in-between two pairs of roof panels 248. The junction between each pair of the roof panels 248 coincides with the location of a corresponding third longitudinal truss 238. Fourth longitudinal trusses 240 are hung under the medial location of each roof panel 248. Variants are possible.

FIG. 49 is an isometric view showing the various components of the roof structure 220 when the roof structure 220 is in its deployed working configuration. The roof panels 248 were omitted for the sake of illustration.

FIG. 50 is a front view of the roof structure 220 of FIG. 49. It shows the front transversal trusses 230 on each side of the roof base structure 208.

FIG. 51 is a rear view of the roof structure 220 of FIG. 49. It shows the rear transversal trusses 232 on each side of the roof base structure 208.

FIG. 52 is a side view of the roof base structure 208 of FIG. 49.

FIG. 53 is a side view of one of the first longitudinal trusses 234 of FIG. 49.

FIG. 54 is a side view of one of the second longitudinal trusses 236 of FIG. 49.

FIG. 55 is a side view of one of the third longitudinal trusses 238 of FIG. 49.

FIG. 56 is a side view of one of the fourth longitudinal trusses 240 of FIG. 49.

FIG. 57 is an enlarged isometric view showing one of the bogies 237 engaging the top rail 231 over the front transversal truss 230 of FIG. 49.

FIG. 58 is a side view of the bogie 237 of FIG. 57.

FIG. 59 is a cross-sectional view taken along line 59-59 in FIG. 58.

FIG. 60 is an isometric view showing an example of the cross braces 280 and a rigging beam 282 provided between one of the third longitudinal trusses 238 and its two adjacent fourth longitudinal trusses 240. The diagonal cross braces 280 are pivotally secured to the third longitudinal truss 238 and their bottom ends are to be bolted or otherwise removably secured to the adjacent fourth longitudinal trusses 240. The horizontal rigging beam 282 extends between the two adjacent fourth longitudinal trusses 240 and the rigging beam 282 is slidable anywhere along the length of the fourth longitudinal trusses 240.

FIG. 61 is a front view of the arrangement shown in FIG. 60.

FIG. 62 is an isometric view showing the second unit 200 with the roof structure 220 in its deployed working configuration.

FIG. 63 is an isometric view showing an example of one of the telescopic columns 250 and its corresponding column base 150 being secured together to form a column structure 260. In the illustrated example, the bottom of the column 250 fits over the top of the frame 152 of the column base 150. Transversal pins or bolts 252 are provided to secure them together. Variants are possible as well.

Each column 250 of the illustrated example includes a plurality of interconnected segments forming a telescopic arrangement.

FIG. 64 is an isometric view showing the column structure 260 of FIG. 63 once assembled.

As can be seen in the example shown in FIGS. 63 and 64, the top end of the telescopic column 250 includes a locking device 262.

FIGS. 65 to 75 show an example of how the column structures 260 can be secured at opposite ends of one of the first longitudinal trusses 234 of the roof structure 220. The roof structure 220 can be secured (or unconnected) to the top end of the columns 250 when the columns 250 are in a retracted (compact) position or in another position that is close to the retracted position, thus when the roof structure 220 is close to the ground. This is an interesting feature of the proposed concept since the operators can work near the ground level.

FIG. 65 is an enlarged isometric view showing the locking device 262 at the top end of the column 250 of FIG. 64. The illustrated locking device 262 includes a hydraulic centering pin actuator 350. This centering pin actuator 350 drives a centering pin 352 in a direction that will be substantially parallel to the corresponding first longitudinal truss 234 (right or left) and also pivotally to move the centering pin 352 between a retracted upward position and a locking downward position. The centering pin 352 is designed to selectively enter through a corresponding slot 354 at the top of the first longitudinal truss 234 (FIG. 70). The centering pin 352 is pivoted into the corresponding slot 354 once the top end of the column 250 is lined up with the slot 354. The alignment can be done by moving the centering pin actuator 350 left and/or right until the position is right.

FIG. 66 is a side view of the locking device 262 in FIG. 65. FIG. 67 is an isometric view of the centering pin actuator 350 of the locking device 262 in FIG. 65 alone.

The locking device **262** also includes a hydraulic actuator **360** having a locking pin **362** at the free end thereof. The locking pin **362** can move in and out of a corresponding eyelet **364** provided at the top of the first longitudinal truss **234** to secure it.

FIG. **68** is an isometric view showing the locking pin actuator **360** and the locking pin **362** of the locking device **262** in FIG. **65**.

FIG. **69** is a view similar to FIG. **64** but where one of the first longitudinal truss **234** is brought next to the locking device **262**. FIG. **70** is an enlarged view depicting the centering pin actuator **350** being operated to line up the centering pin **352**. FIGS. **71** and **72** are side views showing the centering pin **352** being pivoted downward into the slot **354** by the centering pin actuator **350**.

FIG. **73** is a view similar to FIG. **70** but shows the locking device **262** once the centering pin **352** is in a locking position into the slot **354**. If the eyelet **364** and the locking pin **362** are not yet lined up with one another, the operator can use the centering pin actuator **350** to move the parts very slightly right and/or left so as to make the fine adjustments. The locking pin **362** can thus be moved from its retracted position to its extended position thereafter, as shown in FIG. **74**. FIG. **74** is a side view depicting the extension of the locking pin **362** into the eyelet **364**. FIG. **75** is an isometric view showing the locking device **262** afterwards. A cutter pin (not shown) will complete the assembly in this example. Variants are possible as well. For instance, one or more of the actuators **350**, **360** can be designed differently. The shape and/or the relative position of the parts can also be different. Many other changes can be made as well from the illustrated example.

It should be noted that the locking device **262** could be omitted in some implementations and be replaced by another arrangement.

FIG. **76** is an isometric view showing the first and second units **100**, **200** once the column structures and the roof structure **220** are secured together.

FIG. **77** is an isometric view showing the roof structure **220** after being slightly lifted above the floor structure **120** and once the additional components were installed. This low-level vertical position facilitates the installation of additional components, for instance side wings **270** and spaced-apart front supports **272** to which scenic equipment or other elements can be secured. Variants are possible as well.

The roof structure **220** can be lifted using actuators, for instance hydraulic actuators integrated to the column structures **260**. Variants are also possible.

FIG. **78** is an isometric view of one of the front supports **272** that was added in FIG. **77**.

FIG. **79** is an isometric view of the front member **270A** of one of the side wings **270** that was added in FIG. **77**.

FIG. **80** is an isometric view of the rear member **270B** of one of the side wings **270** that was added in FIG. **77**.

FIG. **81** is an isometric view showing the mobile stage framework **400** once the floor structure **120** and the roof structure **220** are in their deployed working configurations and the columns **250** of the column structures **260** are were extended to raise the roof structure **120** from a low-level vertical position to a high-level vertical position. The mobile stage framework **400** is then in its final working configuration and constitutes a solid self-supported construction.

It should be noted that FIG. **81** only illustrates the main structural components of the mobile stage framework **400**. Other components can be added by technicians before the event can begin. As aforesaid, this includes sound equip-

ment, lights, power outlets, handrails, stairs, back and side covers, screen, motor hoist, etc.

To disassemble the mobile stage framework **400**, one can simply follow the steps in the reverse order. Variants are also possible.

The present detailed description and the appended figures are meant to be exemplary only. A skilled person will recognize that variants can be made in light of a review of the present disclosure without departing from the proposed concept. For instance, although the main example used in the present description has a configuration where the second unit **200** is moved into and out of position over the first unit **100** by sliding on it, other configurations and arrangements are possible as well. For instance, the second unit **200** can be brought into position without having it making contact with the first unit **100**. One possible implementation is to open the roof structure **220** next to the first unit **100** and then lift the whole second unit **200** using cranes or the like. The second unit **200** will then be moved into position above the upper stage floor surface before being secured to the column structures **260**. Other possible scenarios include lifting the folded second unit **200** using one or more cranes or the like and positioning it directly over the floor structure **120** of the first unit **100**. Thus, no sliding movement of the second unit **200** directly over the first unit **100** will occur in this case.

Another possible variant is to have the first unit **100** not being completely unfolded before the second unit **200** is brought thereon. However, at least the joists **140**, **142** of the first unit **100** are secured to the column structures **260** before the roof structure **220** is itself secured to the column structures **260**. This provides structural stability without having to install external cables or other additional elements to stabilize them.

The number of column structures **260** can be different than four and the position thereof can be different in some implementations. Also, the columns **250** can be designed without being telescopic and/or other configurations can be used for lifting the roof structure **220** from a low-level bottom position to a high-level vertical position. However, the roof structure **220** needs to be either slidably connected or be otherwise secured to the columns **250**, for instance using bolts or the like, before the roof structure **220** is lifted to a high-level vertical position.

Some implementations may require using vehicles that are not truck trailers to transport the first and/or the second unit **100**, **200**. For instance, the proposed concept could be implemented using railroad cars, boats, etc. Yet, one could divide the first unit **100** and/or the second unit **200** each in two or more independent sections assembled together, for instance, end-to-end prior to use so as to form the first unit **100** and/or the second unit **200**. However, each independent section would only be part of either the floor structure **120** of the first unit **100** or the roof structure **220** of the second unit **200**.

Other variants and changes are possible as well.

LIST OF REFERENCE NUMERALS

- 100** first unit
- 102** first semitrailer
- 104** first chassis
- 106** rear wheels (first semitrailer)
- 108** front end panel
- 109** rear end panel
- 110** arrow (lengthwise direction)
- 112** arrow (widthwise direction)
- 114** front supporting leg

116 rear supporting leg
 118 supporting block
 120 floor structure
 122 storage bay
 124 strap
 126 additional supporting leg
 130 base platform
 132 floor panel
 134 upper panel hinge
 136 bottom panel hinge
 136A inboard flat portion
 136B outboard flat portion
 136C inboard T-shaped bracket
 136D outboard T-shaped bracket
 136E inboard rectilinear slot
 136F outboard rectilinear slot
 136G inboard lever arm
 136H outboard lever arm
 136I medial axle
 136J follower
 136K follower
 136L axle
 136M axle
 138 first track
 139 attachment point
 140 first joist
 142 second joist
 144 bracket
 146 leg
 150 column base
 152 vertically-extending frame
 154 plate
 156 telescopic support
 158 actuator
 180 floor panel actuator
 181 side tab
 182 first linking arm
 184 second linking arm
 188 pivot
 189 space
 190 follower
 192 additional joist
 193 treaded hole
 194 side floor section
 196 supporting leg
 198 additional joist
 199 additional joist
 200 second unit
 202 second semitrailer
 203 truck tractor
 204 second chassis
 206 rear wheels (second semitrailer)
 208 roof base frame
 210 front supporting leg
 211 pin
 212 rear supporting leg
 213 supporting block
 214 second track
 215 first cable
 216 first winch
 217 second cable
 218 second winch
 219A pulley
 219B pulley
 220 roof structure
 222 front carriage assembly
 224 rear carriage assembly

226 transversal actuator
 227 axle
 228 rear actuator
 229 hole
 5 230 front transversal trusses
 231 rails
 232 rear transversal truss
 233 caster wheel
 234 first longitudinal truss
 10 235 caster wheel
 236 second longitudinal truss
 237 bogie
 238 third longitudinal truss
 240 fourth longitudinal truss
 15 248 roof panel
 249 hinge
 250 column
 252 pin
 20 260 column structure
 262 locking device
 270 side wing
 270A front member
 270B rear member
 25 272 front support
 280 diagonal cross brace
 282 horizontal cross braces
 350 hydraulic centering pin actuator
 352 centering pin
 30 354 slot
 360 hydraulic locking pin actuator
 362 locking pin
 364 eyelet
 400 assembled mobile stage framework

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The invention claimed is:

1. A mobile stage framework having a lengthwise direction and a widthwise direction, the mobile stage framework including:
 - 40 a plurality of spaced-apart column structures; and
 - a first and a second self-contained unit, the first and second units being separated from one another and being mounted on a first road vehicle chassis and a second road vehicle chassis, respectively, when the mobile stage framework is fully disassembled for road transportation, the first unit including an articulated floor structure having a folded transport configuration and a deployed working configuration, the second unit being complementary to the first unit and including an articulated roof structure having a folded transport configuration and a deployed working configuration, the floor structure and the roof structure each being in their deployed working configuration when the mobile stage framework is fully assembled and being in their folded transport configuration when the mobile stage framework is fully disassembled for transportation, the floor structure being removably secured to the column structures at first locations and the roof structure being removably secured to the column structures at second locations as well as being positioned directly above the floor structure when the mobile stage framework is fully assembled, the second locations being vertically above the first locations and being vertically movable with reference to the first locations when the mobile stage framework is being assembled and disassembled, the second unit being also laterally movable into and out of position above the first unit when the roof

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structure is unattached to the column structures and the mobile stage framework is being assembled and disassembled, respectively.

2. The mobile stage framework as defined in claim 1, wherein the mobile stage framework includes at least one among the following features (A) and (B):

(A) the second unit is slidable onto the first unit over a pair of lengthwise-disposed tracks provided on an upper stage floor surface of the first unit to receive a corresponding bottom portion of the second unit, the second unit being loaded over and unloaded from the first unit at one side of the first unit;

(B) the second unit is loaded on the first unit in the lengthwise direction.

3. The mobile stage framework as defined in claim 1, wherein the floor structure includes an elongated base platform extending in the lengthwise direction and substantially defining a center portion of the mobile stage framework, the base platform having a right side and a left side with reference to the lengthwise direction, both sides being substantially symmetrical.

4. The mobile stage framework as defined in claim 3, wherein the floor structure further includes:

two sets of joists; and

two sets of floor panels extending in the lengthwise direction, each set of floor panels including a first floor panel pivotally connected to a corresponding one of the sides of the base platform, the floor panels of each set being pivotally connected to one another in juxtaposition and being movable between a vertical transport position and a horizontal working position, the floor panels having top surfaces that are horizontally disposed and coplanar when being supported by the joists in the horizontal working position.

5. The mobile stage framework as defined in claim 4, wherein the floor structure includes a plurality of vertically-disposed floor panel actuators, each actuator having an upper end pivotally connected to a corresponding upper panel hinge between two adjacent ones of the floor panels and also having a bottom end pivotally connected to an intermediary hinge interconnecting a bottom end of two corresponding linking arms, the corresponding linking arms having upper ends pivotally connected to a respective one of the adjacent floor panels.

6. The mobile stage framework as defined in claim 5, wherein each pair of two adjacent floor panels that are connected using a corresponding one of the upper panel hinges includes at least two of the floor panel actuators, the two floor panel actuators being spaced apart in the lengthwise direction and cooperating with their corresponding linking arms.

7. The mobile stage framework as defined in claim 4, wherein the mobile stage framework includes at least one among the following features (A) and (B):

(A) each set of floor panels includes bottom panel hinges between two adjacent ones of the floor panels, the bottom panel hinges being articulated to prevent a portion of the bottom panel hinges from protruding over the floor surface;

(B) the floor panels are slidably supported over a top edge surface of the corresponding joists using followers.

8. The mobile stage framework as defined in claim 4, wherein the innermost floor panels are spaced apart from one another in their vertical transport position to create a storage bay inside an intervening space, the storage bay preferably extending substantially along an entire length of the base platform.

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9. The mobile stage framework as defined in claim 8, wherein the storage bay has a width at least equal to a width of column bases, the storage bay receiving the column bases for transportation.

10. The mobile stage framework as defined in claim 4, wherein the mobile stage framework includes at least one among the following features (A) and (B):

(A) the floor panels have a lengthwise dimension that is substantially similar to that of the base platform;

(B) at least some of the joists have an innermost end that is pivotally connected to the base platform.

11. The mobile stage framework as defined in claim 1, wherein the roof structure includes an elongated roof base frame extending in the lengthwise direction.

12. The mobile stage framework as defined in claim 11, wherein the roof structure includes:

two sets of transversal trusses, each transversal truss having a proximal end and a distal end, the proximal end of the transversal trusses being pivotally connected to a corresponding side of the roof base frame;

two sets of longitudinal trusses, the longitudinal trusses being slidably movable along corresponding ones of the transversal trusses between a transport position and a working position; and

two sets of rigid roof panels cooperating with the longitudinal trusses, the roof panels of each set being interconnected edge-to-edge with ones another, each set of roof panels being movable between a transport position and a working position.

13. The mobile stage framework as defined in claim 1, wherein the mobile stage framework includes at least one among the following features (A) and (B):

(A) each column structure includes a telescopic column having a plurality of interconnected segments forming a telescopic arrangement;

(B) the column structures are four in number.

14. The mobile stage framework as defined in claim 13, wherein the column structures are each positioned at a respective corner of the mobile stage framework when the floor structure and the roof structure are both in their deployed working configuration.

15. The mobile stage framework as defined in claim 1, wherein the first road vehicle chassis is part of a first semitrailer and the second road vehicle chassis is part of a second semitrailer.

16. A method of handling a mobile stage framework during assembly, the method including:

positioning a first transportable unit at a location, the first unit being mounted on a first road vehicle chassis and including an articulated floor structure that is in a folded transport configuration when the first unit is positioned at the location;

securing the floor structure of the first unit to a plurality of spaced-apart column structures;

positioning a second transportable unit over the first unit, the second unit being complementary to the first unit and including a roof structure, the second unit being initially physically separated from the first unit and mounted on a second road vehicle chassis with the roof structure being in a folded transport configuration, the positioning of the second unit over the first unit including moving the second unit next to one side of the first unit, lifting the second unit higher above the ground, and then sliding the second unit over the first unit;

securing the second unit to the plurality of column structures when the roof structure is in a deployed working configuration and at a first vertical position above the

floor structure of the first unit, the floor structure being already secured to the column structures; and moving the roof structure to a second vertical position above the floor structure, the second vertical position being higher above the floor structure than the first vertical position. 5

17. The method as defined in claim **16**, wherein the positioning of the second unit over the first unit occurs while the roof structure is still in a folded transport configuration.

18. The method as defined in claim **16**, wherein the positioning of the second unit over the first unit occurs while the floor structure is already in a deployed working configuration. 10

19. The method as defined in claim **16**, wherein the first road vehicle chassis is part of a first semitrailer and the second road vehicle chassis is part of a second semitrailer, the positioning of the second unit over the first unit includes sliding the second unit away from the second road vehicle chassis over which the second unit was transported towards the location. 15 20

20. The method as defined in claim **19**, wherein the positioning of the first unit at the location includes hauling the first unit on a road using the first semitrailer, and wherein the positioning of the second unit over the first unit includes hauling the second unit on the road using the second semitrailer. 25

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